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CONTRIBUTION TO THE STUDY OF CEREBRAL SURGERY BASED ON AN OPERATION FOR THE REMOVAL OF A TUMOR.

By M. H. Richardson, M.D.,

VISITING SURGEON TO THE MASSACHUSETTS GENERAL HOSPITAL; ASSISTANT PROFESSOR OF ANATOMY, HARVARD UNIVERSITY,

AND

G. L. Walton, M.D.,

PHYSICIAN TO NEUROLOGICAL DEPARTMENT, MASSACHUSETTS GENERAL HOSPITAL; CLINICAL INSTRUCTOR IN NEUROLOGY, HARVARD UNIVERSITY.

The number of reported cases of cerebral surgery is singularly small in comparison with the extent of literature on the subject in the abstract. In a recent article describing three fatal cases, McBurney and Starr state that they have been able to find reports of only eighty-seven cases in which surgical relief of tumor of the brain has been attempted. When we consider the advance made both in cerebral localization and in surgical technique since the subject was broached, this seems an extremely meagre collection upon which to rely for actual data regarding symptomatology, course, and prognosis of operable growths. That the actual number of cases far exceeds this estimate is beyond question.

It is natural that cases resulting unfavorably should not be reported with such enthusiasm as the successful ones; but it seems the duty of the practitioner to report all cases, both successful and unsuccessful, in so important a branch of medicine and surgery as this, limited as actual experience must of necessity be—first because operable tumors are of comparative rarity, and secondly because of the reluctance on the part of the patient or his family to submit to an operation of this magnitude;

to say nothing of the hesitation on the part of the practitioner to advise this step except where absolutely sure of his ground. That there is much uncertainty in connection with this subject, even at the best, is evident when we realize that the most marked focal symptoms, including local spasm and paralysis, may be present without demonstrable lesion in the locality indicated by such symptoms, and conversely that the motor tract may be invaded by a gross lesion, apparently sufficient to have produced both irritation and destruction, without giving a clue during life to its seat, or even existence. Not that these exceptional cases detract in any degree from the established facts regarding cerebral localization, which are now too firmly fixed to admit of question, but practically their remembrance cannot but serve to temper the zeal both of the neurologist and the surgeon.

As an example of the former type of uncertainty in cerebral localization, we would mention a case occurring in the Massachusetts General Hospital, where an abscess had been opened in the temporal lobe, resulting from extension of ear disease. A few days later localized spasms suddenly appeared, limited to the hand of the opposite side, and accompanied by corresponding weakness. Metastatic process was at once diagnosticated, and a new opening was made over the hand centre, with an absolutely negative result, beyond a rather free serous discharge. Post-mortem examination revealed nothing definite beyond the temporal abscess. Such cases detract in no degree from the accuracy of our knowledge regarding the hand centre, nor should they deter us from making at least an exploratory excision over the hand area; they do show, however, conclusively, that distant lesions may set up an irritability of motor centres—an element always to be borne in mind when we are tempted to assure the family of success in a given case.

Each reported case, successful or unsuccessful, adds something to our stock of knowledge in this by no means exhausted field.

The percentage given by the writers above alluded to (THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES, vol. cv. No. 252) both of success in finding the tumor and of recovery after removal, is probably larger than it would be if all unsuccessful operations were faithfully reported; but even making due allowance for this probability, we have left a result sufficiently gratifying to mark a most important era in surgery and neurology—by no means less important from the point of view of the patient and the practitioner than of medical science in the abstract, in that it offers at least a hope of relief in one of the most serious of ills to which humanity is subject.

The patient whose case we have to report—T. B., of Springfield, aged forty years, married—was under the care of Dr. C. P. Hooker, of that city, who first called Dr. Walton to see the case on February 22, 1892.

The history was as follows: He had been subject for some time to

occasional attacks of headache of brief duration, and at times found difficulty in expressing himself. At first these attacks occurred only at intervals of two weeks, then of a week, then of only a few days. This was about the frequency when he first consulted Dr. Hooker, about a month ago. The attacks had now increased in intensity and frequency, so that the pain was almost unbearable, and he had had as many as two in an hour. The pain was rather worse at night. A fortnight previously he had seen double, the images being horizontally placed. Of late a red spot had appeared in the field of vision, situated somewhat to the left. There was considerable photophobia—worse on the left. He had had no trouble in understanding what people said, as regards the words, but had been unable at times to connect the idea with the word, both spoken and written. For example, he did not realize the meaning of the word "Blaine" (word-deafness); and, again, could not tell whether the number 3650 on a box corresponded to 3650 on a shelf (mind-blindness). He kept saying "barrel of lead" for "loaf of bread," though he knew what he wanted (ataxic aphasia). His previous health was good; his family history negative.

Physical examination showed a large, well-developed man. The pulse was 64, full and soft. The gait was normal; there was no paralysis of motion or sensation. The pupils were alike and reacted to light. There was paresis of the abducens oculi on the left. The patient spoke slowly, and occasionally misplaced words, always correcting himself, however. During an attack of pain the pulse dropped to 48. There was homonomous restriction of the field of vision on the right (hemianopsia) falling short of the median line.

The acuity of vision was unaffected. The fundus showed a haziness which suggested commencing optic neuritis, though the edges of the nerve were distinct and there were no hemorrhages.

It was decided best to postpone operation long enough to give specific treatment a full trial, though nothing in the history indicated this etiology. (The event proved that the new growth was not of specific nature).

This treatment was faithfully carried out by Dr. Hooker during the next few weeks. Three days after Dr. Walton's visit he was taking 95 grains of potassium iodide *per diem*. At this time the left pupil seemed slightly larger than the right, and reacted sluggishly to light.

One week later Dr. Hooker wrote:

SPRINGFIELD, March 1, 1892.

DEAR DOCTOR: Concerning B., headache so intense that he requires morphine, gr. $\frac{1}{4}$, with atropine, gr. $\frac{1}{150}$, every morning and night. Before use of morphine the pain was constant and severe, with half-hourly exacerbations. At this time, pulse 40 and skin bathed in sweat. Pain localized more in left occipital region, near median line, just above protuberance. Ataxic aphasia much more marked; hardly utters a sentence without mispronouncing one or more words or substituting some word which sometimes makes sense, more often does not. Difficult to understand him. Appetite indifferent. Vomits three or four times a day—no connection with taking food. The vomiting seems more like regurgitation, and is often copious—for example, half a chamberpotful. No paralysis except of sixth. Diplopia marked to-day. Think his mind is a trifle cloudy. Potassium iodide, gr. 110, to-day. I do not think potassium iodide has anything to do with his symptoms. Thought possibly morphine might make him a trifle dull. The nausea is not such as we see with morphine.

Will write again this week and give you result of ophthalmoscopic examination. Yours in haste,

C. P. HOOKER.

Three days later he wrote as follows:

SPRINGFIELD, March 4, 1892.

DEAR DOCTOR: Yours of the 3d received. Dr. Morgan examined B.'s eyes yesterday—finding double optic neuritis. The nerve is not visible in either eye and is swollen fully 3½ D. There are multiple hemorrhages. The pain is more occipital than ever. All the symptoms seem more intensified. He is weaker and confined to his bed. Night before last I made a minute of some of his errors of speech. Notice the fact that in nearly every one the letter L is either omitted or unnecessarily put in: *Glood* for *gruel*; *bleefsteak* for *beefsteak*; *expain* for *explain*; *mate* for *late*; *sweeping* for *sleeping*; *speak* for *sleep*. He attempted to say *first-rate*, said *first-nete*, noticed his error and in attempting to correct it said *first-nice*—this seemed to satisfy him. Mrs. B. made an error in giving him the iodide, so he has not taken as much as I thought he had; however, he will take 165 grains to-day. He cannot take it in milk, but bears it well in seltzer water. Think they would sanction an operation if I said so, but I am of the opinion that he is past all medical or surgical aid. I am using from ½ to ¾ gr. of morphine in twenty-four hours, to control his pain. Sincerely yours,

C. P. H.

Two weeks later Dr. Hooker wrote that his sight was decidedly worse and that it was very difficult for him to express himself. His general condition was more unfavorable, and he vomited nearly everything ingested. At this time he was taking 210 grains of the iodide *per diem*. He complained also of vertigo, and it was hard to make him answer questions. He had failed that day more than on any three previous days. On the following day a consultation with Dr. Richardson was held, and operation decided to be imperative.

His condition before operation was as follows:

He lies in bed quiet; hiccoughs from time to time; subsultus is present. Complains of pain behind the left ear. He has lost flesh and strength decidedly. The double vision is so troublesome that he keeps the left eye closed. Aphasia is marked. Calls pain, "eye." Pulse, 100; temperature, 99.3°. Tongue normal. When he tries to speak a long sentence it becomes practically unintelligible. The knee-jerk is absent on both sides.

It was decided that we had to do with a rather large tumor on the left side, of unknown nature and origin, seated posteriorly to the motor tract, involving either directly or by pressure the occipital lobe (affection of vision), the angular gyrus (mind-blindness), the posterior part of the temporal lobe (word-deafness), and possibly the island of Reil (aphasia). The paralysis of the sixth nerve was considered due to pressure downward, not to direct involvement of its course at the base of the brain. This is a not infrequent symptom in large growths, on account of the long course of this nerve over bony prominences; moreover, the post-mortem examination justified this conclusion. It was considered on the whole best to include the angular gyrus and occipital lobe in the exploration, on account of the prominence of ocular symptoms, hemianopsia, mind-blindness, and red spots in the field of vision. The two latter pointed to cortical irritation in the region of the angular gyrus, or to association fibres passing to it, and made it probable that the hemianopsia resulted directly from injury to the occipital lobe or optic radiations rather than from pressure upon the optic tract.

Operation. The operation was performed at the patient's house by Dr. Richardson; Drs. Hooker and Herrick, of Springfield, Dr. Mumford, of Boston, and Dr. Swasey, of New York, assisting. Dr. Walton was present and advised regarding the various steps of the operation.

Previous to the operation the head had been shaved and the skin rendered as thoroughly aseptic as possible by soap, prolonged mechanical cleansing, and bichloride poulticing. The patient took ether well. A crescentic incision was made over the area decided upon, the convexity upward and backward, the diameter of the space involved being about three inches. The bleeding was profuse, but easily controlled by catch forceps. The skull was exposed and the periosteum turned back. With a three-quarter-inch trephine the cranial cavity was opened behind and below the parietal eminence, about two inches behind the fissure of Rolando. This opening was enlarged forward and upward with rongeur forceps. The dura mater was tense, bulging, and non-pulsating. There was nothing remarkable about its color. A flap was turned back in the usual manner, upon which there was a striking protrusion and eversion of the cortex that indicated extreme pressure from within. The everted brain substance was apparently granular in character.

There was very considerable hemorrhage, which was with difficulty controlled by the gauze tampon and numerous ligatures. The operator then introduced the finger readily into the cranial cavity. All parts within a radius of three inches were thoroughly explored, but no definite tumor boundaries were detected, nor did any induration appear, the peculiarly altered brain substance and the extreme pressure only pointing to the presence of the tumor below. (This brain substance proved on autopsy to be commencing new growth of similar character, though of less density, than the underlying tumor proper.) Further enlargement of the opening in the skull was considered, but was abandoned owing to the everted brain overlapping the already exposed edges, with the probable extent of the proposed operation, the presumably large size and deep seat of the tumor, and the very alarming condition of the patient. Under these circumstances, after consultation, it was thought best to abandon further exploration.

The question of removing the cerebral hernia was considered, but this was thought unnecessary.

The flap of dura was replaced as far as possible, and the skin was easily brought into its proper position and secured with six interrupted silver wire stitches. Provision for drainage of the very considerable hemorrhagic oozing was made by iodoform gauze wicking, and a large absorbent dressing was applied.

The patient was put to bed, and after being stimulated rallied quickly, and completely recovered from the ether in a few hours.

On the following day Dr. Hooker writes:

SPRINGFIELD, March 11, 1892.

DEAR DOCTOR: B. is in good condition. Temperature, 99°; pulse, 90–132, steady. There has been no vomiting or attempt to vomit since the operation. Aphasic symptoms are much exaggerated, except when first spoken to; then he is coherent for a few moments. Eyes look more normal and he does not close the left eye when speaking, as he has for weeks. The subsultus was noticed this morning for the first time since operation. The bandages have not stained through, and there are no signs of suppuration.

Aside from his rapid pulse and increased aphasia, he is more comfortable than before operation. Yours truly,

C. P. HOOKER.

Three days after operation Dr. Hooker writes:

SPRINGFIELD, March 13, 1892.

DEAR DOCTOR: Our patient, B., is in a decidedly comfortable condition. There has been absolutely no rise of temperature since the operation; the dressings remain intact, without showing a stain of oozing; his mind is clear, or nearly so; the aphasia, very marked for three days after operation, is now better than before, and he writes his name characteristically and legibly. His vision is better, and there is no complaint of diplopia.

Certain it is that the operation was successful in a palliative way, if in no other. There is no pain except such as comes from the pressure of the tight head bandage. I keep him under morphine, but have not increased the dose —half a grain twice daily.

I shall remove the dressings in a few days.

Yours sincerely, C. P. HOOKER.

The following letters were received regarding the condition from this time until the death of the patient:

SPRINGFIELD, March 24, 1892.

DEAR DOCTOR: B's condition still remains favorable, and he is very cheerful and happy. The aphasia, while noticeable, is, by a comparatively easy effort, corrected. He has complained of a slight pain on the right side, in the parietal region, just above the squamous portion of the temporal, I should judge. He was inclined, a few days ago, to be babyish, but that has passed away. His mind is not as clear as before, but I think it is improving. I dressed the head yesterday, and there was no pus. The tumor under the scalp is four inches in its longest diameter, three and a half inches in its shortest, and projects from the skull about three-quarters of an inch. Its contour is as convex as a half-orange. There is a slight oozing from the drainage-tube, which I removed and cleaned in peroxide, that seems to be broken-down brain matter. Its consistency is about like that of laudable pus; its color a muddy pink, *i. e.*, slaty pink; quantity about two drachms in six days. The extruded brain which I mentioned is flattened and shrunken. One opening, about the size of a buckshot, remained when the gauze was inserted. Morphine, half a grain once daily.

I enclose a sample of his writing, done this morning while in a semi-recumbent attitude, twisting the body for light, the paper held on a book.

I think the vision very much impaired, for he does not seem to be able to see ordinary large type. Perhaps he has an inability to comprehend the significance of written or printed characters (?). It is a remarkable case, and the operation was justifiable if for no other reason than that it gave him such great relief and prolonged existence. Yours truly,

C. P. HOOKER.

SPRINGFIELD, March 28, 1892.

DEAR DOCTOR: B.'s condition is not quite so favorable, though there are no special developments. The temperature went up to 100 last night, so I removed the dressing. I found the tumor not enlarged—if anything slightly smaller; marked pulsation throughout; portion around drainage-tube covered with thin layer of pus; pus also exuding from the tube. I removed the tube and syringed with peroxide. The place where gauze was inserted shows ragged brain tissue, flattened to the level of the scalp and disintegrating. The aphasia, while it is very apparent, is corrected with comparative ease. No pain or tenderness. No diplopia. Vision is very feeble, however. I think his mind is somewhat dull. He sits up daily and is able to walk about. His appetite is good. Bowels act with salines. One peculiarity is that he has no

conception of the meaning of figures. When asked his age (his birthday comes the 29th), he said he was fourteen.

He has gained in flesh, looks fairly well, and is very cheerful.

Yours truly, C. P. HOOKER.

SPRINGFIELD, April 6th, 1892.

DEAR DOCTOR: Our patient, B., is on the down grade. March 26th seems to mark the day when his bad symptoms developed. He has steadily lost ground since then, though he is by no means in such a desperate condition as he was the morning of operation. I should think that, unless some unforeseen complication arises, he might live a month or more. He is dense, and the aphasia is very marked, so marked that at times it is not possible to comprehend him. Again, by ingenious guessing, one can make out his meaning. He is discouraged and fearful—threatening to terminate his existence for fear of the loss of his reason. There is slight incoördination in the movements of the right arm, and the hand-grasp of the right is distinctly weaker than that of the left. The cicatrix is gradually stretching apart, and the brain tumor is increasing. There is free suppuration—so free that a daily dressing is required. Notwithstanding, the temperature has never been over 100°, and is normal to-day—never has reached 100° but once. I syringe the wound with peroxide, and keep on a sublimate dressing. I could not possibly keep the wound aseptic. Yours sincerely, C. P. HOOKER.

The patient died on April 23d—fifty-one days after operation.

The autopsy showed a more or less lobulated, pear-shaped mass occupying the region of the posterior parietal and anterior part of the occipital

lobe on the left side, lying quite loosely attached. The growth penetrated nearly to the mesial surface of the brain. The temporal lobe seems to have been pushed downward and the occipital lobe backward by the growth. Its consistency was somewhat firmer than that of the brain substance, was easily distinguishable from it, in places being separated by a narrow fissure; at other places, especially at the vertex, running gradually into the brain substance, so that entire enucleation of the growth would have been impossible. The edges of brain surrounding it were ragged, and evidently infiltrated with a new growth.

Microscopic examination showed it to be a highly vascularized round-cell growth, with a large amount of very finely fibrillated intercellular substance. Diagnosis, glioma. (Dr. W. F. Whitney.)

REMARKS.—The pathological findings in the case demonstrate the practical accuracy of the localization—namely, that the bulk of pressure was in the region of the angular gyrus and involving the occipital lobe. The immunity of the speech centre from actual new growth justifies the conclusion that the aphasia was the result of pressure, or of affection of the association fibres and sensory factors necessary to speech, or to both, rather than to implication of the speech centre. The mind-deafness was due to the involvement of the posterior part of the temporal lobes. It will be seen by the accompanying cut that the temporal lobes were somewhat twisted by the pressure, so that the fissures became more nearly vertical than horizontal. The fissure of Sylvius was also pressed forward so as to become more vertical than is normal. The motor centres were practically intact, as was to have been expected. The tumor was apparently of very rapid growth, and, large as it was at the time of operation, it was much larger at the time of death. It had doubtless also pressed toward the surface, partly by natural growth, and partly on account of lessened resistance in that direction. Dr. Whitney states that a piece of the cortex removed at the operation, and given him for examination, showed much the same structure microscopically as the tumor, though less dense. It is possible, therefore, that the tumor proper eluded the touch of the operator partly by the deep situation of the portion directly under the point of operation, and partly on account of the very slight difference in its consistency from that of the protruding brain. In a similar case, on such a marked protrusion of brain, the writers would be inclined to enlarge the opening indefinitely, to explore further, and remove everything possible, for the absolute hopelessness of expectant treatment being apparent, it would seem wise to give the patient the benefit of an exhaustive search, even in spite of the dangers of the operation.

The difficulty in using the rongeur forceps to enlarge the opening in the skull after the dura mater was opened and the brain literally pouring out, would lead us in another case, where so great evidence of pressure existed, to enlarge the opening, before cutting the dura mater, to the

fullest extent likely to be required. The disadvantage in this procedure is the uncertainty in which direction to extend the opening, a disadvantage which is more than counterbalanced by the increased facility in operating, especially as it is a matter of comparatively little moment if the opening proves somewhat larger than necessary—a most improbable situation in any event. The plan of cutting out a semicircle of bone and reflecting skull and skin together, breaking the lower edge for the purpose, certainly offers the advantage of sufficient room for exploration, but has not recommended itself to the writers as necessarily more practicable than the old method of trephining and enlarging. In the first place, we feel safer with the bone removed than replaced, even when replaced under the most favorable circumstances.

The absence of even larger pieces of bone, though apparently disadvantageous, has been proved by experience to detract in no material way either from the patient's comfort or safety, whereas replaced bone is always a possible source of future trouble.

With regard to the hemianopsia, it seems probable that its origin was central, as supposed, *i. e.*, due to involvement of the occipital lobes and optic radiations. The optic tracts themselves were apparently intact. A noticeable feature shown by the fields is an homonomous retraction, alike in both eyes, but not reaching the middle line. This form of hemianopsia is less common than complete hemianopsia, or even loss of a quadrant, but has been already observed.

The subsequent history of the case would seem to justify leaving the protruding brain untouched, for its presence certainly affected in no way unfavorably the progress of the case, which was certainly remarkable, the relief of pressure symptoms alone justifying operation.

RECENT INVESTIGATIONS IN FARADIC ELECTRICITY: VARIATION AND CONTROL OF THE CURRENT BY RAPIDITY OF INTERRUPTION AND VARIATION OF COILS, AND THE SINGLE-WIRE HIGH-TENSION CURRENT.

By George J. Engelmann, M.D.,
of St. Louis.

I have been for years more or less interested in the therapeutic development of faradic electricity, but have as yet made no public mention of the interesting results achieved; hence it is with pleasure that I can now not only present a *résumé* of my investigations and experiments, but can demonstrate the practical results accruing therefrom—the new faradic apparatus—together with some of the novel

physical and physiological results obtained thereby. With safety I may say that the therapeutic usefulness and adaptability of faradic electricity has been largely increased by the widely extended range and the controllability of interruption, and the defining and precising of the various secondary coils, as evolved by experiment directed toward the precising and controlling of the faradic current; the essential features from which all has branched being the rapidity of interruption and the character of the secondary coil. But whatever may have been achieved, and all that I can now show, although new in form, is merely a developing and perfecting of principles laid down in my first paper on "Electricity in Gynecology," read before the American Gynecological Society at its Baltimore meeting in 1886, and of axioms then outlined and clinically demonstrated. In that paper I called attention, first, to the importance of the variability of interruption and the determining of these interruptions; secondly, to the importance of differently constructed secondary coils as necessities for the variation and perfect control of the therapeutic effects of faradism; and thirdly, to the necessity of precision in all the essential details for purposes of record, dosage, and comparison. I sought, in respect to faradic electricity, the same precision and possibility of record and dosage that had so rapidly advanced galvanism in professional favor as a therapeutic agent; and I believe that the points at that time aimed at have now been achieved, and that satisfactory results may be confidently looked for.

With the introduction of the galvanometer the constant current made rapid progress, but it is only within recent times that attention has again been given to faradic electricity, and such progress as has been made has been precisely in the lines mapped out in the paper above referred to. This will be better explained by giving an outline of the status of galvanic electricity then and now. It was not many years ago (at Baltimore in 1886), that I vainly attempted to procure a galvanometer in the city named for the purpose of demonstrating its use in therapeutic applications. Such an instrument could not be obtained until my esteemed friend, Dr. Wilson, by aid of the telegraph, succeeded in securing one from Mr. Fleming, in Philadelphia. It is probable that hardly a milliampèremeter was in use at the time; the galvanic current was vaguely and crudely applied. Now it has become an exact and well-defined agent of known therapeutic value. It was the galvanometer—the guide to precision, to dosage and record—which gave to galvanism its impetus and the confidence of the profession; and it is this precision, this possibility of record and dosage, which is needed to place faradism upon its proper basis.

But what was the status of the more variable sister to the continuous current, the more intangible induced, or faradic, at that time? Then, and for years thereafter—until Messrs. Waite & Bartlett produced a

battery in accord with the suggestions made in that very paper toward the greater variation of interruption and coils—the ordinary sharp-current instrument with a single coil and a practically non-variable interruptor held sway and was used throughout. We must, of course, except the Tripier instrument made by Gaiffé, which, however, was used only by a few specialists, and was almost wholly confined to scientific laboratory experiments; and the Rockwell instrument, made by Kidder, with a secondary coil of different sized and lengthened wire, wound on one and the same spool and tapped so as to be used either singly or in series. This was the pioneer instrument in this country, and certainly the best. Such was what was known as "faradic electricity" in electro-therapeutics when I outlined what I deemed the essentials for progress, the very principles upon which the instrument now perfected is based. These principles I will quote from the paper already referred to:

"The effect of the current varies with the number of interruptions and with the nature of the helix, . . . with the length and thickness of the wire forming the secondary coil. . . . Sedative effects are best attained by the utmost frequency of interruption, and muscular effects by slow interruption. . . . A current of feeble tension and greater quality as developed by the short coil of thick wire has the best contractile effect on the muscle, and a current from a long coil of fine wire, a current of higher tension and less quantity, affects the muscle less and the nerve more."

To all this I still adhere, and I am gratified to see that these principles are gaining ground and are bringing faradic electricity to the front, as is evident from the demand for improved instruments and the more general manufacture and use of instruments with well-regulated coils and interruptors; yet, while this is a great improvement, more still must be achieved. The best of these instruments, those made for Goelet and Hutchinson by the Galvano-faradic and the Chloride of Silver Battery Co., the Fleming instrument, and the Mackintosh imitation of the Gaiffé, as well as the earlier models of my own instrument made by Waite & Bartlett, approximate to some extent the desired conditions; but they lack the necessary range, precision, and controllability of interruption and coils.

Faradism in its present status is incomplete and unsatisfactory as a therapeutic agent; and as the character, the quality, and the effect of the faradic current, quite contrary to the galvanic, depend entirely upon the producing apparatus, it is this which must be improved. Clinical experience had told me that the rapidity of interruption and the character of the secondary coils were the essential elements, so that I sought to obtain in these factors the utmost range and precision. With such objects in view the new apparatus was constructed; it is the direct result of physical and physiological experiment based upon a knowledge of

clinical needs and therapeutic demands, and substantially proves the correctness of the course pursued and the remarkable variation of current-effect which can be produced.

I here refer to the instrument itself, because, as I have already stated, it is upon the apparatus that the quality and effect of the faradic current depend—unlike the galvanic, which is practically independent of the generator, currents from all sources being about the same.

To give the induction current the necessary range and precision, it proved essential that the instrument be provided with:

1. An adjustable, variable, and recordable interruptor of great range up to 50,000 or 100,000 interruptions per minute, with a motive power separate and distinct from that of the primary inducing flow.

2. A series of secondary coils of definite quantity and electro-motor force, with great range, each adapted to a certain therapeutic purpose.

3. An adjustable core, with scale to determine its position.

4. The possibility of precise record of all details; this means a primary coil of known resistance and electro-motor force proportionate to current strength and secondary coils to be used, and a primary current of known intensity.

I would strongly urge a uniformity or construction for core and primary coil, and uniformity of primary galvanic flow; this would greatly facilitate record and comparison, and could easily be accomplished, as most primary coils are very much alike, and there is no great variation in the galvanic force employed—from 2 to 6 volts and from 600 to 1300 milliampères being generally used; this is readily controlled by rheostat and galvanometer, and brought to the desired average intensity.

The new apparatus is constructed with reference to precision in all details, but it is the interruptor, with motive power separate and distinct, securing interruptions far more rapid than any hitherto obtained, and interruptions determinable in number, together with precisely defined secondary coils, which give the instrument its individuality, and I take pleasure in saying that the satisfactory result which has been achieved is due to the kindly manner in which Messrs. Waite & Bartlett have placed their efficient force and their material at my disposal; while the solving of practical problems, the practical carrying out of my ideas, I owe to Mr. Harry Waite, who has been my constant aid in all experiments made in this city; therapeutic tests being constantly made in my clinic by my assistants, Drs. Ameiss and Temm.

The interruptor. While the rate of vibration or interruption is one of the essential features of faradic electricity, it has hitherto been regarded merely as a necessary mechanical factor for the production of the current, of no therapeutic value whatsoever. Although variability is the very life and essence of faradic electricity, attention has never been directed to the importance of interruption in medical currents. Some vague references

have here and there been made. Gordon, in his *Electricity*, briefly mentions a high-speed interruptor used for experimental purposes, but does not say what those experiments were, and, in fact, lays no further stress upon this fact. Dr. William Scheppegrell, of New Orleans, in a most progressive publication which has just come to my notice, speaks of a similarly constructed interruptor as adaptable to galvanic and faradic currents, but gives no details as to any peculiarities of current, and makes no especial therapeutic claims for such current. Dr. William Hutchinson is the first to speak of therapeutic effect, and in a paper read before the American Electro-Therapeutical Association in October, 1892, advocates the singing rheotome, claiming interruptions of great rapidity, with astonishing anæsthetic effects; he unfortunately bases his measurements of speed upon aural comparisons with the tuning-fork—giving results which have not been fully borne out by my own investigations—and I may here say that I deem more positive tests of the rate of the interruptions necessary than these, as few possess the delicate ear and the musical training necessary to make these comparisons; but no matter what the speed possible, the rapidity of any vibrator so constructed cannot be controlled within a satisfactory range, nor can the necessary rate of vibration be secured whenever desired; any good features which it may possess are of no avail until it is used with a motive power separate and distinct from that employed for the coils. I deem it of less value for medical purposes, as its rate of interruption depends upon the strength of the therapeutic current to be used; hence rapid interruptions are out of the question where mild currents are to be employed, rapid interruption necessitating strong currents.

I must here express myself more fully upon this point, as I deem the separation of vibrator, or interruptor, from the induction coil itself essential to the development of this form of electricity as a therapeutic agent. Hitherto the interruptor has been regarded as a mere mechanical factor, a mechanical necessity for the production of the induced current, and it has been in no way connected with therapeutic effect; hence it has been a part of the apparatus, and will always be directly connected with it in the average coil for the sake of simplicity of construction and cheapness.

In order to obtain the most satisfactory physiological and therapeutic results from the faradic current, the interruptor must be separate and distinct from the coils and propelled by a distinct motive power, for the following reasons:

Changes in the primary galvanic current are necessary to control the rapidity of interruption, and this must be accomplished without affecting the physiological current from the coils, as changes in the primary flow supplying the coils must be accomplished without affecting the rapidity of interruption—all of which can be done only by employing a separate motive power for each.

For the purpose of properly actuating the vibrator, primary galvanic currents of too great an intensity have been used.

Rapidity of interruption or alternation is a factor of large general importance, too long overlooked, which will yet claim greater attention, both for mechanical and for therapeutic purposes in connection with faradic electricity and with alternators and vibrators of other kinds. Mr. Tessla has demonstrated the marvellous mechanical results of rapid vibration, and D'Arsonval revealed the surprising insensibility of the system to currents of extremely rapid alternation, and also proved their sedative effects. For physical, physiological, and therapeutic purposes, rapidity and variability of interruption and alternation are most important, and if it is true that the effect of the faradic current is mainly due to its mechanical influences upon the molecular constitution of the organism, the great importance of regulating that vibration is evident. That mechanical vibration is potent as a curative agent has been repeatedly proven, first in England, and interest in this subject is at present excited by the experiments of Charcot with the *médecine vibratoire*. Isolated cases have been published. Boudet, of Paris, cured facial neuralgia by the vibrations of a tuning-fork, 200 per second, communicated to a sounding-board upon which was fixed a small rod with ball end, which was placed upon the face at the point of exit of the infra-orbital, thus communicating this vibration to the nerve. After an application of from five to six minutes the pain ceased for a time, and by continuance of the treatment a cure was achieved. In the Salpêtrière a large tuning-fork was used, placed upon an extensive sounding-box, the atmospheric vibrations produced thereby acting as did the rod in the other case, and with similar satisfactory results, even to the restoration of muscular activity in the paralyzed lower arm of a hemi-anæsthetic. Varying rates of vibration have been successfully used by Dr. J. Mount Bleyer, of New York, in the treatment of diseases of the ear, and if there is any truth in the theory of the variation of molecular vibration as determining nerve disease and its cure by corresponding vibrations, the necessity of precisely determining the vibrations used is self-evident.

But it is only to the interruption of the faradic current that I will here refer. The increased rapidity of these interruptions and the ability to control them render the application of effective currents possible to the most sensitive tissues, and give the greatest scope to the efficiency of those currents, especially increasing their sedative powers. The new instrument gives us every variation of interruption; we retain the vibrators as before used upon the Waite & Bartlett battery, but with a separate motive power of, at most, two Gonda cells; there is a single impulse key; the slow vibrator giving us up to 1000 or 1500 interruptions, and the rapid vibrator giving from 1000 to 3000 or 4000. These, of course, cannot be controlled with absolute precision, and precision within such

limits is hardly necessary, but if desired it can be attained by the new instrument, which gives us slow interruptions with absolute precision up to 400 per minute, and all the more rapid interruptions from 3000 to 50,000 and 100,000 per minute can be obtained with a like precision.

The interruptions are obtained from the commutator upon the axle of a small motor, and have been determined in number by the use of the speed indicator, which is compared with the current intensity propelling it, the speed being governed with precision by the current used; hence, after the preliminary experiments the rate of interruption, or the speed of the motor, is indicated either by the galvanometer or, when a red-acid cell or storage battery of known force is used, by the rheostat. This instrument, however, serves not only as a controllable high-speed interruptor for these condary faradic current, but may be used as interruptor or alternator for the primary and for the galvanic current. I will here only speak of it as an interruptor in faradic electricity, and its importance in this capacity will be appreciated after a brief review of some of the physiological experiments made which demonstrate the great variation of effect produced by variation of the rate of interruption.

The effect of faradic electricity, best demonstrated by mild currents, slowly increases with the rapidity of interruption, as observed both upon motor and sensory nerves, up to 2500 or 3000 per minute; then slowly decreases with an increase in the rapidity of interruption. The greater the current strength the greater the number of interruptions necessary to reduce or annul its effect completely, the muscle ceasing to respond before all impression upon the sensory nerve is lost. A moderate current, such as that from coil No. 3 of my battery (Waite & Bartlett) at 45 of the scale, or one-third of the coil in circuit, will produce muscular contractions with from 45 to 100 interruptions per minute; this current grows stronger with an increase in the rapidity of interruptions up to 4000 per minute, then soon decreases. Muscular contraction ceases at 5000, at 6500 its sensory effect is barely noticeable, and before a rapidity of 10,000 is reached it ceases to be felt altogether. A very strong current, such as one from No. 3 coil completely overlapping the primary, with an inducing force of four Leclanché cells, and applied through large moist electrodes—in other words, a current too strong for therapeutic applications with the ordinary vibrator at 3000 per minute, is barely perceptible with 25,000 interruptions per minute, and ceases to be felt altogether at 28,000. The rapidity of interruption controls the physiological effect of the current as perfectly as the sledge movement of the secondary coil, so that, all other conditions remaining unchanged, it is an index of current strength which may well be utilized. The therapeutic value of rapid interruption rests upon our ability to employ strong, efficient currents without discomfort, and is found in the nerve-quieting, sedative effects of these interruptions with fine coil currents.

The coils. Therapeutic use having proved the variable effects produced by coils of different length and thickness of wire, my experiments were made on this basis: that quantity and electro-motor force of current, as determined by resistance or diameter of wire and number of winds were the determining factors, as far as physiological and therapeutic effects of the secondary coil are concerned; and this has been proved correct, but the practical question remained as to the precise conditions under which currents of the greatest therapeutic value were produced, and under what conditions each special effect would best be obtained. Coil upon coil was wound as previous results seemed to indicate, and although still reserving final decision, I should now say that we have at least approximated the physiological and therapeutic extremes. Motor, to the exclusion of sensory effect—that is, painless influencing of the muscle—is most satisfactorily attained by secondary coils of the lowest possible resistance with the largest possible electro-motor force or number of winds: by the heavy-wire coil, with a resistance of 0.7 or 0.8 of an ohm and 500 to 600 winds, of No. 15 wire, and better still by an increase in the electro-motor force by the use of fine wire in multiple—this being a coil of 6500 winds of No. 32 wire, with 4.1 ohms resistance. The opposite condition, that is, the highest possible resistance with the lowest possible electro-motor force, produces the most painful currents as used for purposes of counter-irritation—this is a coil of No. 40 wire, 528 winds, and 180 ohms resistance. The utmost penetration, together with satisfactory general therapeutic effects upon the nerve, is obtained by coils of higher resistance and greater electro-motor force. Thus, a generally serviceable coil is one of from 4000 to 6000 winds and from 250 to 740 ohms resistance; for sedative purposes, for the benumbing or anæsthetic effects, a still higher electro-motor force is necessary, as in a coil of 9000 or even 12,900 winds and 2500 ohms resistance.

To better illustrate what these figures mean, I will say that the longest coils heretofore made for medical instruments have, in the best, been of 3500 to 4000 winds, or 2000 feet, and good vibrators gave 3000 interruptions per minute, or 50 per second.

Such have been the results obtained after careful experimentation with coils of the most various kinds. We have seen that low resistance with high electro-motor force is the coil most effective upon muscle, causing least sensation; and the highest resistance with the lowest electro-motor force is the very opposite—is the most intensely nerve-irritating coil without muscle effect; while the penetrating motor and sensory effects, varied by the character of application, are produced by an increase of both resistance and electro-motor force, sedative effects being best produced by the highest possible electro-motor force. But I believe that a limit is to be placed to this, at least when used in connection with the ordinary bat-

tery force and primary coil, and that this need certainly not exceed 9000 or 10,000 winds.

From all clinical and physiological experiments it is evident that the quantity and electro-motor force of the current, as indicated by resistance and by the number of winds, are the determining factors; hence an instrument can be of value only when these data are given, and given with precision; coils must be accordingly marked, just as the dosage is indicated for any other remedy, and for purposes of record and comparison these points must be referred to. For the sake of comparison, it would be preferable that certain standards should be adopted, yet as this is almost impossible, each manufacturer advocating his own special instruments, these instruments should at least be precise, with definite and clearly indicated qualities.

It would seem needless to insist upon the use of properly constructed coils, such as best serve the purpose intended to be accomplished, and yet attention must be directed to this point, as some still claim all effects from one and the same coil, or from one and the same coil tapped at different points. It is, indeed, true that varying effects can be obtained from one coil by varying the method of application, but by no means so distinctly and so satisfactorily as by a variation of coils; in short, such results are primitive, partial, and incomplete. Each of the coils I have selected answers a definite purpose, best attaining the desired effect without complication by other unnecessary and often deleterious action.

The coil of 4.1 ohms resistance and 6500 winds contracts the muscle thoroughly without influence of any kind upon the nerve, and the coil of 180 ohms resistance and 528 winds produces a painful counter-irritation without any effect upon the deeper tissues; and nothing demonstrates more strikingly the great importance of resistance or diameter of wire upon the physiological effect of the current: this coil gives a painful current and does not in the least affect the muscle, whilst a coil of 0.85 of an ohm resistance and 528 winds gives a current which is hardly appreciated by the sensory nerves, but acts well on muscular fibre; and this striking contrast may be observed with the same number of winds in circuit, or precisely the same electro-motor force. It needs but the testing to prove the necessity of coils so varied for the satisfactory use of faradic electricity in medicine; hitherto it has not been a very useful agent, for the reason that our apparatus has been imperfect and we have lacked the means of developing the most valuable feature of this form of electricity.

Actual galvanometric measurement of the secondary faradic current in micro-coulombs is possible, but is no indication whatsoever of physiological effect, hence useless for the physician and useless for record and dosage. Until greater progress is made we must refer to the following

data in lieu of direct measurement: *a.* Strength of the primary galvanic inducing force. *b.* Character of primary coil. *c.* Position of core. *d.* Number of winds and resistance of secondary coil and its position upon the scale in reference to the primary. *e.* Number of interruptions. *f.* Character and location of electrodes. *g.* Duration of séance. This record is possible only with precise, well-authenticated instruments, and instruments in which the motive power controlling the interruptor is independent of that used for the coils.

In conclusion I may say that by means of this increased rate of interruption and a greater variation in secondary coils, the therapeutic possibilities of faradic electricity have been greatly extended; and by the exact determination of the rate of interruption, with the character and position of the secondary coil—the character of secondary coils being determined by their resistance and the number of winds—comparison, record, and dosage are possible. Not only can we attain a great variety of therapeutic effects by the proper combination of the various essential factors, but as these can all be defined and determined, dosage and record are approximated to such an extent that with instruments properly constructed and precised, satisfactory work will be possible and faradic electricity will assume its proper place as a therapeutic agent.

The single-wire high-tension current is one of the products of the induction coil which is, perhaps, of greater interest experimentally than of value therapeutically, yet I will take the opportunity of demonstrating curious phenomena which have developed from Mr. Harry Waite's suggestion of grounding one pole. The negative pole of the break current being the most intense, this is used, and the positive grounded; a high-tension current is thus obtained, even at quite a distance from the generator; it is similar to the static, and produces some curious effects. This current is more like a pure static than like the so-called static induced.

While there may be little therapeutic use for the high-tension single-wire current, it is nevertheless worthy of trial, and I desire to call attention to it as useful in neuralgic conditions; and applied by the hand of the operator in the various forms of headache and in the giving of massage, marked physiological effects have been observed, but I am not as yet in a position to demonstrate their therapeutic powers.

The mechanical effects are shown by the glow of the incandescent lamp and by the spark, which is like the static; a small electric lamp, such as is used for laryngeal purposes, or a 118-volt incandescent lamp, may be set aglow twenty, thirty, and more yards away from the apparatus, by contact with the negative pole, if the glass bulb of the lamp be held in the hand of the operator, it being indifferent whether or not he be upon an insulated platform; it will likewise glow if he pass the current through

his body, seizing the negative wire in his hand and grasping the metallic base of the lamp in the other, then approximating the glass bulb to some other individual. While this is the carrying of the current by means of a single wire, it is a pure induction effect, and not like those startling results obtained by Mr. Tessla—dependent upon rapidity of vibration, unless it be molecular. The glow will be produced as a momentary flash by single contact; as contact is more rapidly made, as vibration or interruption succeed each other more rapidly, even at from 500 to 1000 per minute, these successive flashes merge into a constant glow, a glow which varies with each individual lamp: in some it follows the carbon filament, or centres upon that part of it nearest the fingers or hand grasping the glass bulb; in others it is independent of the filament, as a diffuse glow, but most frequently more intense toward the grasping fingers. Different lamps of the same voltage act very differently, probably owing to the different conditions of the vacuum—its more or less perfect state; so also is the effect a different one, whether the vibrator of the coil itself is used or whether the separated interruptor is employed, which gives no flash on single contact, either make or break, and does not produce the glow until a rapidity of from 8000 to 10,000 per minute is obtained. This reaches its height at from 10,000 to 15,000 interruptions per minute, decreasing as these grow more rapid. These effects were produced by a red-acid or Grenet cell. Only carefully wound, well-insulated coils can be used, by reason of the extremely high tension of the current—which, on a damp day, will throw a spark of one-third of an inch. The most satisfactory results were obtained from a coil of high electro-motor force, 9000 winds of No. 36 wire; both physical and physiological effects diminished with an increase or decrease of electro-motor force, and are barely noticeable from coils with as few as 4000 winds, or with as many as 13,000.[1]

The spark produced in damp weather has quite an effect through high resistance. From the point of a metallic electrode it is painful, and acts intensely upon motor points, but the skin must be very dry. When applied by means of the entire hand, to the forehead, for instance, no sensation is produced, and yet a physiological effect is undoubted, so that this must prove a satisfactory method of therapeutic application, as any degree of sensation can be produced by a lessening of pressure until the surfaces are barely in contact.

Mild, general applications of this high-tension single-wire current have a marked constitutional effect, as became evident from the similar conditions experienced by all engaged in these experiments, and repeatedly

[1] As one coil of 13,000 winds has produced intense single-wire currents, I cannot be positive upon this point; and these coils demand such careful winding and insulation that they are not always fitted for high-tension experiments; this was with a resistance up to 2500 ohms; with lower resistance a higher electro-motor force could be utilized, *i. e.*, if heavier wire be used, and the result would be much more intense, as we find it from the Ruhmkorff coil.

experienced. A weariness, a relaxation, with nervousness in some, was followed by a healthy tire and refreshing sleep. The ordinary metallic electrode touched lightly to the motor points, with slow vibration, 80 to 100 per minute, contracts the muscle forcibly, and without pain; 500 to 1000 vibrations per minute are more painful. The rapid vibrator, 3000 per minute, gives a softer current, the sensation in all cases disappearing with a firm pressing down of the electrode.

I have cited these high-tension single-current effects from high voltage coils of the faradic apparatus on account of the physical facts which they demonstrate, and for the purpose of indicating therapeutic possibilities.

The peculiarities of opening and closing current, of positive and negative pole, of varying rates of interruption, and of difference in coils, are all marked in the high-tension current; the flash on single contact is observed only in the opening, not in the closing current, as the predominance of opening over closing current, which increases with increase of resistance, is very great with this high resistance; the predominance of the negative over the positive pole is likewise strikingly evident; the light, like the physiological effect, increases with the rate of interruption to a certain point, and then decreases; so likewise does the effect increase with an increase of the electro-motor force, or the number of winds in the coil, attaining a maximum with a certain relation of electro-motor force to resistance, then again to decrease as electro-motor and resistance increase still more.

In the glow of the lamp we see the fact well demonstrated that a certain phase of current, a certain coil, within given limits of the electro-motor force and resistance, is necessary to determine a certain effect. Precisely so is it with the coils needed for motor and nerve effects. We also see that a certain rate of vibration best produces the light effect, as definite rapidities of vibration are most effective for different physiological effects.

Therapeutic possibilities only can be indicated, as there is hardly sufficient intensity in the single-wire currents as obtained from the ordinary medical battery, even with 9000-wind coils, to produce very marked effects, and these are dependent to a considerable extent on the weather. To produce always reliable and efficient currents of this kind, we must have a stronger primary galvanic flow, and coils of higher electro-motor force, with less resistance, than is possible from the small spools of the medical instrument.

I was highly elated at the result of our first experiments, which happened to have been made under extremely favorable conditions, but soon found that these could not be relied upon, so that I would now be less sanguine in the hopes of therapeutic success; and yet this current merits consideration and trial. It is certainly of interest in its physical features.

3003 LOCUST STREET, ST. LOUIS.

A CONTRIBUTION TO THE STUDY OF THE TREATMENT OF APPENDICITIS, WITH A TABULATION OF FOUR HUNDRED AND FORTY-EIGHT CASES, INCLUDING SEVEN CASES OF THE WRITER'S.

By Miles F. Porter, A.M., M.D.,
of Fort Wayne, Indiana.

Under what circumstances is surgical interference justifiable and proper? It goes without saying that recourse should be had to the knife in cases manifesting signs of perforation, gangrene, or suppuration, in cases of frequent recurrence, and in cases where pain and tenderness continue, accompanied or not by a tumor. But shall we operate in "all cases of catarrhal and ulcerative appendicitis . . . as soon as the lesion is recognized?"[1] Or shall we follow the advice of Wier,[2] and delay operation in the milder cases of short duration "until it is indubitably proven that the invalidism is a confirmed one." Norman Bridge says: "Surgery is justifiable in all cases of undoubted chronic appendicitis, with occasional exacerbations, even if no induration is present."[3]

In studying the reports of cases for the purpose of arriving at an answer to these questions, we must conclude what symptoms, signs, and history are necessary for the diagnosis of appendicitis. Joseph Price says: "Cases of appendicitis that get well without evidence of severe lesion are always open to the doubt of being appendicitis at all."[4] I cannot subscribe to this view. There seems, reasoning from analogy and from the general principles of pathology, no sufficient proof to establish this doctrine. It is also not in accord with the opinion accepted by the majority of the best surgeons of to-day. Fitz, as quoted by Dennis in his masterly article in the *Medical News*, vol. lxi. p. 698, places recurrence at 11 per cent. If Price's view were adopted, then but few, perhaps, would be found objecting to Senn's advice above given. But if the well-known signs and symptoms, as usually given without a history of recurrence, are considered a sufficient basis for the diagnosis of appendicitis, then there seems reason for hesitating before acting upon it. In this connection it is pertinent to note those cases of localized ulceration of the cæcum which may be mistaken for appendicitis. Aside from the cases noted in Dennis's article, already referred to, Dr. Sutton, of Allegheny, reports a case to me by letter, in which there

[1] N. Senn: Journal of the American Medical Association, November 2, 1889.
[2] Annals of Surgery, May, 1891.
[3] Medical News, vol. lvi. p. 553.
[4] Annals of Surgery, May, 1891.

was perforation of both cæcum and ileum, requiring resection. Dr. Bridge, in his article above cited, also describes a case which proves that all the symptoms of appendicitis, including recurrence and tumor, may be present without either abscess or appendicitis.

Of the seventy-seven cases[1] in the appended table in which it is known that operation was not deemed advisable, there were no deaths, and while they have not all been followed for any definite length of time, yet no recurrences are known to have taken place. By reference to the table it will be seen that many of this number are known to have remained free from trouble from one to six months and longer.

Dr. Fitz, as quoted by Joseph Price,[2] places recurrence at 44 per cent. in his paper written in 1890; while Kroft, quoted also by Price, puts it at 22 per cent.

Taking all the facts as given on the subject of recurrence, we must conclude that the large majority of cases are solitary, though we are not warranted in making a positive statement as to the exact percentage.

It is not known how many of these recurring cases of appendicitis terminate in resolution; but as Dennis says: "Nearly all authorities, however, are in accord with the general statement that a majority of the cases undergo resolution, and that only exceptionally perforation occurs."[3]

Senn,[4] Morris,[5] and Joseph Price[6] regard the mortality of removal of the appendix as practically *nil* in uncomplicated cases. Morris, in a letter to the writer under date of April 22, 1893, says he has had "thirty-one cases of appendicitis in various stages of the disease, but without abscess, and all of these have made excellent recoveries after operation (two recent ones still in bed)." But how are we to tell before operation in all cases whether they are complicated or not? Is it not highly probable that there will often be found adhesions, which, while they enhance the danger of operation, render the likelihood of perforation or fatal peritonitis exceedingly improbable?

Of the fourteen cases of removal of the appendix during quiescence in the accompanying table, one died from sepsis. Occurring, as this death did, in the hands of a surgeon as well trained as Fenger, it must be given due regard. It seems warrantable to conclude, then, that *the danger of recurrence itself is not sufficient ground for operation.*

Well-defined tumors may disappear by absorption, the patient making a complete recovery.

[1] Fenger, 50; Hibbard, 3; Porter, 4; Griffith, 3; Saundby, 14; Link, 3.
[2] Annals of Surgery, May, 1891.
[3] Medical News, vol. lvi. p. 699.
[4] Journal of the American Medical Association, November 2, 1889.
[5] New England Medical Monthly, April, 1893.
[6] Annals of Surgery, May, 1891.

No tumor may be found, and yet large quantities of pus be present.

Presence of gas in an abscess may give a tympanitic resonance over a large collection of pus.

There may be no marked fulness, tenderness, or pain in cæcal region, and the operation prove the appendix perforated and the presence of pus and general peritonitis.

All the foregoing statements are proven by cases in the accompanying table. Hence, it may be said that the presence of a tumor is not of itself a sufficient warrant for operation, while it may be absent in cases clearly demanding one; that the absence of marked cæcal fulness, tenderness, and pain should not be deemed sufficient to bar operation; that tympanitic resonance, if other signs and symptoms demand it, should neither delay operation nor cause one to refuse to operate. The facts on which these conclusions are based, together with the case of Dana, in which the first symptoms were those of general peritonitis, and that of Winslow, in which there was absence of abdominal tenderness, with subnormal temperature, both cases dying on the third day,[1] serve to illustrate the difficulties of diagnosis which may arise, and emphasize the advice of Joseph Price to "resolve doubt by exploration." Browning's case of recovery after removal of a perforated appendix in the presence of general peritonitis and collapse teaches one not to refuse operation in any case, however desperate, if there is the slightest hope of success.

If we operate, on what day or hour of the disease shall it be done? In the accompanying table are fourteen primary cases that were suppurative or perforative almost from the beginning. A reference to Burnie's, Jacobson's, and Ransohoff's cases of removal during attack, in which there was general suppurative peritonitis on the first and second days of the attack, and to Jacobson's case of incision and drainage in which the pus was shut off from the general cavity of the peritoneum on the one hundred and thirty-seventh day of illness, still further illustrates the fact that a timely operation in one case, so far as hours and days are concerned, may be too late an operation in another.

A study of the appended table seems to show that there is less danger in deferring operation in recurrent than in primary cases. That this would be the case, we are led to believe by *à priori* reasoning because of the adhesions likely to form at each attack. Two facts seem settled: 1. When an operation is to be done, the earlier it is done the better the chances for recovery. 2. The character of the attack and consequent condition of the patient, and not the number of hours or days of illness, should form the basis of decision as to the proper time for operation.

Having decided that operation is advisable, what shall be the nature

[1] Both occur in annexed table under cases not operated.

of it? Here, again, the character of the case and the condition of the patient should form the basis of decision. Where an abscess has formed which may be opened and drained without invading the peritoneal cavity, there is grave reason for doubting the propriety of attempting the removal of the appendix except in those cases where the conditions will permit of its removal without undue prolongation of the operation or danger of tearing the adhesions which shut the pus out of the general peritoneal cavity. I cannot agree with Morton,[1] who says: "In no case should a simple evacuation of pus be considered sufficient, especially if the history of the case presented any account of former appendix trouble." Ransohoff, in a letter to the writer, says: "I have never lost a case of abscess. I do not look for the appendix. If it is in the abscess I remove it. If adhesions are present I let the appendix alone." He has had nine cases of appendicular abscess. This has been my experience in three cases, embraced in the accompanying table, one of them being an extremely unpromising one. This case would have died, I believe, had removal of the appendix been attempted.

The mortality rate of incision and drainage, in the cases here tabulated, is 18.18 per cent., and that of removal of the appendix during attack is 19.7 per cent. This is a decidedly favorable showing for incision and drainage, when we consider the number of cases treated by the latter method, because their desperate condition precludes the idea of any but the simplest operation; together with the fact that all cases treated by incision and drainage are pus cases, which are notoriously unfavorable for excision; and that many of the cases of excision are not pus cases, consequently are favorable cases for excision. The danger of permanent fistulæ or recurrence is urged by some against incision and drainage, but the danger from these sources cannot be compared to that incurred through efforts at removal. Against the more radical(?) operation, and in favor of the simpler one is: the time consumed in the operation; the danger of tearing through adhesions and opening an avenue for infection of the general peritoneum; and, finally, the fact that the removal of the appendix does not positively insure against fistulæ or relapse of inflammation. Referring to the table, it is to be noted that after excision there were in the 151 cases four in which were sinuses remaining unhealed after periods varying from two months to three years, and in one case two relapses, death following the operation for the second relapse.

In the 187 cases of incision and drainage there were seven fistulæ remaining after four months and longer. In those cases with general peritonitis, whether perforative or not, in which the appendix cannot readily be found, or, being found, is so adherent as to make its removal

[1] Journal of the American Medical Association, vol. x. p. 734.

a difficult or prolonged operation, the patient will, because of his depressed condition, be given a better chance for his life by incision cleansing, and drainage with tube or gauze, or both, than by excision—the latter operation being made later if necessary.

Dr. Edward Sonnenburg, an abstract[1] of whose article in the *Sammlung klin. Vorträge*, 1891, No. 13, is to be found in the *Annals of Surgery*, vol. xvi. p. 440, advises operation by two sittings in cases of appendicitis with deeply seated pus. He says: "Experience has shown that by this method it is possible within a few days to again find the deeply seated pus-focus, and then to open it without injuring the peritoneum. Since in this way the operative procedure brings the patient no danger, it will be more readily possible in even doubtful cases to decide for operative treatment, and thus make the treatment more rational." Just how many cases he has operated in this way is not stated, nor is the precise method of operating given in the abstract—the original I have not seen. The greatest objection to this method of operating is, perhaps, that while we are waiting for adhesions to form after the first sitting before completing the operation, the abscess may burst or the patient become septic. Yet if, as Sonnenburg says, this "procedure brings the patient no danger," might it not be commenced so much earlier than the usual operation as to rob this objection of its force? The probability of its being a safe method of treating a class of cases which, with methods now in general use, has given us a frightful mortality, is strong enough to warrant a trial of it.

What shall be the method of operating for removal of the appendix? Where there is a tumor this is often taken as the guide for the incision. In the absence of tumor the majority seem to favor incision in the right semilunaris and the wisdom of this choice is proven not only by the operations thus made, but also by the results of Bryant's[2] investigations of the anatomy of the appendix. In his table concerning the location and direction of the appendix, we find it inward in 34, behind the cæcum in 32, downward and inward in 28, and into the true pelvis in 21, in a total of 144 cases. Either of these locations is accessible through this incision. Trendelenburg's posture, allowing, as it does, the pus to run out if present, and the operator to see the parts he is operating upon, renders comparatively easy and safe what in any other position would be a difficult and dangerous operation.

The complete and permanent recovery of the patient after removal of the appendix depends in no small measure upon the treatment of the stump. The ideal method seems to be that in which the stump, after ligation, is turned into the cæcum and buried by Lembert sutures, as described by Senn in his article referred to above, and described and

[1] William Browning (Brooklyn). [2] Annals of Surgery, February, 1893.

illustrated by Morris in the *New England Medical Monthly*, April, 1893, p. 331. Indeed, I am convinced, by a careful study of all the literature upon this point accessible to me, that unless the stump be thus treated or in some way be covered by peritoneum after ligation, the removal of the appendix leaves the patient in great danger of perforation. One of the cases (Browning's) in the accompanying table might be chosen from among a number as a reference to emphasize this statement.

Care should be used in closing the wound in the abdominal wall to secure against ventral hernia. Whether or not the danger of hernia is less after stitching the several layers of tissue separately, than it is after stitches carefully applied in the ordinary way, I have been unable to satisfy myself from the material at my command.

Whole number of cases		448	
" " " recoveries		371	
" " " deaths		77	
Average mortality rate		17.23 per ct.	
Removal of appendix during attack	Recovered	122	= 80.3 per ct.
	Died	29	= 19.7 "
		151	
Removal of appendix during quiescence	Recovered	13	= 92.86 "
	Died	1	= 7.14 "
		14	
Incision and drainage	Recovered	154	= 81.82 "
	Died	34	= 18.18 "
		188	
Appendicitis—no operation	Recovered	82	= 86.32 "
	Died	13	= 13.68 "
		95	

ON THE OCCURRENCE OF A FORM OF CHRONIC BRIGHT'S DISEASE, OTHER THAN TYPICAL FIBROID KIDNEY, WITHOUT ALBUMINURIA.[1]

By D. D. Stewart, M.D.,
LECTURER ON CLINICAL MEDICINE IN THE JEFFERSON MEDICAL COLLEGE.

Since Bright first directed attention to the relationship existing between albuminuria and diseases of the kidney, the presence in the urine of serum-albumin in quantity detectable by time-honored tests has properly been accepted to indicate renal derangement. So necessary is this association generally regarded that many otherwise acute clinicians, in pinning faith to the presence of albumin as an infallible guide to the recognition of nephritis, are not infrequently led into the error of inter-

[1] Read before the Pan-American Medical Congress, Washington, September, 1893.

preting this fact into the necessity of excluding kidney disease with the absence of albumin; for not infrequently do we encounter in published reports of cases, otherwise admirably presented, in which a diagnosis may hinge upon the renal condition, the conclusion stated as if none other were possible, that the kidneys are sound, the urine being free from albumin. Search may also have been made for casts, which, unencountered, naturally strengthens the opinion previously reached.[1] In such cases no cognizance is taken of often a more important examination, the determination of the nitrogenous output; or of the highly momentous fact, apparently little known, that albumin may be totally absent from the urine throughout the course of chronic Bright's disease, and casts may be only detectable after much search, yet the case progresses steadily to a fatal termination, the remote ailment perhaps never being suspected, either *ante-* or *post-mortem;* the determining cause of death, a pneumonia or an inflammation of a serous membrane, alone being recognized. It is, indeed, not improbable that chronic nephritis without associated albuminuria is of no uncommon occurrence. That it exists undetected and untreated there is no doubt. It thus must increase to some degree the mortality record of other ailments; death, in these cases, often ensuing less from total renal failure than from visceral or serous complications induced by long-continued partial renal inadequacy.

My attention was first directed especially to this subject by encountering the first two of the cases herein recorded. One of these, with certain symptoms suggestive of decided renal inadequacy, but without those that are usually regarded as typical of chronic Bright's disease, had consulted several clinicians of note in this city, and Charcot in Paris, as to his ailment, which he suspected to be renal because of the small amount of urinary solids habitually excreted; but because of non-detection of albumin and casts, the case had been dismissed by these as one of hypochondriasis or of neurasthenia. As laboratory work brought me not infrequently into contact with this case, several cursory surveys of the symptoms, subjective and objective, caused me to suspect a latent kidney ailment, despite the negative opinions previously given. I then instituted a careful examination of the urine for some time. A brother of this patient, with somewhat similar symptoms, who also came under observation, was believed on examination to be affected similarly. Encountering these cases suggested a search for others. A number of these were so soon collected as to indicate that the combination of chronic

[1] In instances such as this it is not improbable that a microscopic examination is often not thorough, the absence of albumin prejudging the observer against more than a perfunctory search; for in any condition with non-albuminous urine, or urine containing but minute traces of albumin detectable only by most delicate tests, renal epithelia or casts cannot be numerous. Their discovery often then necessitates painstaking search, even under such favorable conditions as the use of the centrifugal machine to obtain concentration of sediment, and intelligent employment of a low-power lens as a searcher.

Bright's disease without albuminuria was of no unusual occurrence, and that I had probably overlooked many instances in the past. It likewise clearly showed that similar cases were undoubtedly commonly unrecognized.

Not that the occurrence of this supposed unusual condition is absolutely unknown, or, in connection with symptoms of typical granular or cirrhotic kidney, has passed altogether undetected; for more than four decades ago Wilks,[1] of Guy's Hospital—the birthplace of our knowledge of albuminuria and of Bright's disease—in first describing the two principal forms of chronic nephritis,[2] to which description all later English writers have more or less adhered, also pointed out that the granular kidney[3] could occur and run its course quite symptomless, albuminuria sometimes being absent. Since that time, however, though the occasional occurrence of typical fibroid kidney without albuminuria has not been forgotten, the likelihood of its existence has only been recognized by a few. No text-books on general medicine especially notice the occurrence, and few special treatises on renal disease more than barely mention what Wilks observed. Some of our leading authorities fail even to lay stress upon the occasional absence of albumin in typical granular kidney. These not only overlook the class of cases I now report, but neglect to note that, even with classical symptoms of fibroid kidney, such as pale, plentiful urine, fibroid vessels, and hypertrophied heart, occurring at middle life or in the aged, chronic Bright's disease may occur and run its course without albuminuria.

Bartels,[4] it is true, cites a case carefully studied in the five weeks preceding death, in which albumin was totally absent from the urine except during a few days in which high fever occurred, due to vaccination. Though with symptoms suggestive of renal fibrosis, because of the absence of albumin, an ante-mortem diagnosis was not made. In narrating this case Bartels indicates his idea of the infrequency with which similar cases occur, though he states that he has repeatedly witnessed the *temporary* absence of albumin in chronic Bright's disease.

Jaksch, whose work on laboratory and clinical medical diagnosis is our accepted authority, totally fails to recognize these cases. He speaks of periods of temporary absence of albumin in granular kidney, but

[1] See Guy's Hospital Reports, vol. viii., 2d series.

[2] The term nephritis is not used here in a strict pathological sense, but refers equally to true inflammation of the renal structure as to a condition which is actually *non-inflammatory*, but of the nature of a degeneration. Sir William Gull pointed out, in describing the arterio-capillary fibroid kidney (AMER. JOURN. MED. SCIENCES, 1886, vol. xci. p. 407), what previously, I believe, had been recognized by others, that the renal changes are not really of an inflammatory nature, so that the term *nephritis* is strictly not justified here. There is no acute stage; no acute hyperæmia; no diapedesis of leucocytes and blood-cells, characteristic of ordinary inflammation; and no local or general symptoms indicating nephritis.

[3] Looked upon by Wilks as an indication of senility, with its associated tortuous thickened radials, characteristic pale abundant urine, and tendency toward uræmia or apoplexy.

[4] v. Ziemssen's Cyclopædia, vol. xv. p. 440.

states that an examination of the total twenty-four hours' urine will nearly always reveal its presence, which has not been discovered in a single specimen passed perhaps in the forenoon. Even the late Fagge, under whose eye in Guy's Hospital cases of typical arterio-capillary fibroid kidney, reported by Mahomed, were studied, in which albuminuria was absent or was but an inconspicuous feature, lays little emphasis upon such a combination in his splendid classic on Medicine. Our own writers on general medicine remark still less the occasional absence of albumin in these cases. The most recent and most widely read text-book is that of Osler, a name occupying a pre-eminent position in medical science. This work, because of its inherent worth, embodying the results of years of faithful observation and patient research, and because of the deserved wide fame of the author, is easily first of its kind. Yet Osler, too, here fails to assist in the recognition of the class of cases in question. He speaks only in this relation of that variety of granular kidney, such as was described by Wilks, in which polyuria is common. In this he merely states that traces of albumin are found, but may be absent at times, particularly in the early morning urine.

But two writers on diseases of the kidney, and these Americans, Millard and Purdy,[1] have especially directed attention to the occurrence of chronic nephritis without albuminuria, referring, however, only to the usually described variety of granular kidney with typical symptoms. Millard relates two cases in which albumin, though frequently examined for, was at no time found. One of these was shown *post-mortem* to be interstitial nephritis with a limited glomerulo-nephritis. The second was a probable case of renal fibrosis. Death did not occur while this case was under observation. The general health was good. Casts were repeatedly found in the urine, though albumin remained absent.

Both Millard and Purdy refer to the important papers by Mahomed,[2]

[1] The former in his work on Bright's Disease; the latter in a special paper, "The Pre-Albuminuric Stage of Chronic Bright's Disease," Chicago Med. Journ. and Exam., May, 1885. Purdy refers only to the typical arterio-capillary fibroid kidney of Sir William Gull. Curiously, in his work on Bright's Disease, published a year subsequent to the appearance of this paper, Purdy barely states, in discussing cirrhosis of the kidney, that "albumin may be temporarily absent in the early stage, but as a rule it will be found, if it is sought for, over a sufficient length of time."

[2] "The Clinical Aspect of Chronic Bright's Disease," Guy's Hospital Reports, 1879, vol. xxiv. "Chronic Bright's Disease Without Albuminuria," Guy's Hospital Reports, 1880–81, vol xxv.

It is necessary here to state that in reviewing Mahomed's statistics, Dr. Purdy places the figure of non-albuminuric cases among these as too high. He also assembles with these, I think improperly, 76 cases out of a total of 98 in which a diagnosis of Bright's disease was not made, observed at the Birmingham General Hospital, reported from post-mortem records by Dr. Saundby, in a paper "On the Occurrence of Dropsy in Granular Kidney." Though it is not stated by Saundby that albumin was searched for in the urine of the 76, Dr. Purdy thinks that it may be fairly assumed that such examinations were made, since the cases were under observations in hospital, and perhaps subject to the usual rule for daily examination of urine. But as many of these were cases of hernia, bronchitis, fractures, amputations, burns, ulcers, skin diseases and the like, in which a urine examination could not have seemed especially indicated, and as no account of such examination appears in Saundby's report, it is unfair to assume

in which are analyzed a number of cases of granular kidney, under observation in Guy's Hospital during 1879 and 1880, in which albumin was more or less constantly absent from the urine in the period in which observations were made. Most of these cases were in the degenerative period of life, with fibroid arteries and hypertrophied heart, but were without special symptoms referable to the kidney.

Though a strikingly interesting series of cases, and ably reported by Mahomed, his description of at least a minority of them[1] does not make it clear that renal disease was a certain accompaniment of the symptoms described—referable in the main to other organs. In this minority, no account of microscopic examination of urine is given, and in a number of cases the urine is described as normal. Estimations of nitrogenous excretion in any save a few, and in these to but an imperfect extent, were also not attempted. In a few of those in which death occurred while under observation and a necropsy was obtained, the kidneys were also stated to be healthy, though the cases were regarded by Dr. Mahomed as those of chronic Bright's disease, as he understood the term.[2]

Mahomed adopted the term chronic Bright's disease as a convenient generic name for a condition which Gull and Sutton had previously described of generalized arterio-capillary fibroid change. Contrary to the view of Johnson, an extension of that of Bright, and following in the lead of the above-mentioned investigators, Mahomed viewed the condition underlying the various stages of granular or fibroid kidney as

that albumin was habitually or even occasionally absent. [Since writing the above note, Dr. Saundby has kindly informed me by letter that Dr. Purdy is wrong in his assumption; that so far as he (Dr. S.) knows, no examinations for albumin were made; the cases came from anybody, and that he knew nothing of their clinical history. Dr. Saundby also tells me that he does not think albuminuria often absent in Bright's disease.] In the first report of Mahomed's, on 100 cases of granular kidney observed in Guy's Hospital, in which death occurred in 26 directly from kidney disease, it is stated by Mahomed that albumin was absent from the urine, not in all, but in a large proportion (exact number not stated), so that Dr. Purdy's figure of 74 per cent. of non-albuminous urine in 259 cases of granular kidney (Mahomed's and Saundby's) is not a little excessive. Apart from this, as I have elsewhere stated in this paper, it is not certain that a number of Mahomed's cases, though perhaps rightly styled by him cases of chronic Bright's disease, as he understood this term, were in reality suffering from actual renal disease.

[1] Such as cases 16, 17, 18, 19, 22, 23, 24, 25, 27, 30, 37, 42, 43, 47, 48, 52, 53, and 56.

[2] As a result of certain considerations, which Dr. Mahomed thought supported his view, he recognized three stages of chronic Bright's disease. Of these the first, a functional stage, he regarded as limited to a condition of simple persistently high arterial tension, without organic changes in the vascular system or in the kidneys. This stage, he believed might precede for years the onset of degeneration in the kidney. The second stage, he termed chronic Bright's disease without nephritis—using the term nephritis in the strict pathological sense of a true inflammatory condition of the kidney. In this stage the organic changes are apparent in the vascular system and in the kidney (arterio-capillary fibrosis—red granular kidney). The kidney, post-mortem, is found to be the seat of interstitial change, without epithelial alteration. In the third stage, which Mahomed classed as chronic Bright's disease with nephritis (the mixed or mottled granular kidney), he regarded as the natural but by no means invariable termination of the ailment. In this stage, epithelial changes have occurred in the kidney, the cirrhotic alterations are marked, and the symptoms of renal disease prominent. This, he stated, is the stage in which the disease is usually diagnosticated. The 61 cases which he reported characterized by the absence of albumin from the urine, he considered as belonging to the second of these stages.

a systemic disorder in which the cardio-vascular alterations were not dependent upon, but either antedated the development of the kidney fibrosis, or, more rarely, existed without renal change.[1] It was not necessary for him that the kidney should actually be the seat of degeneration to constitute Bright's disease. Fibroid kidney was but an unnecessary, if more or less to be expected, incident in the general morbid state. Renal fibrosis did not always appear, though general arterial change occurred. Yet Mahomed thought kidney alterations present in most of the cases he reported at this time, although in a number of them, as has been stated, there seemed no positive evidence of this, and in two it is recorded that a necropsy showed healthy kidneys.

Mahomed's views were extreme in that he regarded a thickened vessel as a certain forerunner of fibroid kidney, if the latter were not already existent. Without desiring to discuss here the still unsettled question as to the sequence of events in chronic Bright's disease, whether cardio-vascular alteration precedes or accompanies the renal, claiming a common origin, or follows the latter, dependent upon kidneys already inadequate through disease, I may say that I am by no means prepared to admit that a diseased kidney is the sole cause of increased vascular tension and subsequent arterial degeneration; nor can I accept Mahomed's teaching that persistent high arterial tension or a thickened vessel is a certain indication of present or expected kidney change.[2]

Apart, however, from the doubtful cases of renal disease among those reported by Mahomed in which albuminuria was absent, there remain a good number in which, with the urine free from albumin, undoubted granular kidney existed. Be that as it may, Mahomed's cases were all in middle or advanced life. There were present decided cardio-vascular changes, such as hypertrophied heart and thickened vessels. These cases were reported especially to show that in the stage of Bright's disease in which epithelial alterations in the tubules were absent—or, if occurring, were but transitory in character—albuminuria was absent, the urine remaining practically normal, and symptoms referable to the kidney, *i. e.*, those of renal inadequacy, were uncommon. Death in these cases, as Mahomed remarks is usual in granular kidney, resulted from failure of other organs, notably the heart.

The few cases I here report in which the character of symptoms, together with result of frequent urine examinations, leave no doubt as to the existing diseased kidneys, although albumin is absent from the urine, are of a class distinct from the cases hitherto described in which a diag-

[1] See preceding foot-note.

[2] Mahomed styled a high-tension radial a *renal* pulse. He suggested that visible and tortuous temporals were an indication of renal disease, and regarded this as a point to aid in the separation of a mitral insufficiency, the result of a previous rheumatic endocarditis, from that arising from overstretching of the left ventricle as a result of resistance *a fronte* in the arterial sclerosis of fibroid kidney.

nosis of fibroid kidney could be made from the association of age with cardio-arterial disease and with such a common symptom as abundant, low-gravity urine. In the latter, apart from general fibroid changes, the kidney was in most cases fairly healthy and functionated accordingly. In my cases, without cardio-vascular symptoms other than increased tension, there are present those referable to the kidney, with, in several, marked renal inadequacy both as regards excretion of water and of solids.

In the urine examinations of all the cases here recorded, the following methods were employed: Albumin was in every case examined for in mixed specimens of the twenty-four hours' urine, as well as in single specimens voided at varying times in the day. The tests used were a saturated solution of plain picric acid—this was in every instance the test first applied to each specimen of urine examined;[1] Millard's phenic-acetic acid solution[2]—this was used when no response occurred to picric acid, and on other occasions to confirm results obtained by picric acid; metaphosphoric acid was also often employed, not alone, but in addition to the other tests. Indications of even a slight contact ring occurring to picric acid or Millard's solution, either immediately or after standing for some time, a second specimen of urine was treated with glacial acetic acid. If the urine was concentrated—rich in salts—an excess of acid was added to insure complete precipitation of any mucin present.[3] This,

[1] Recent experiments in these and in other cases have convinced me that even plain (unacidulated) picric acid solution *will* precipitate mucin. This I had before doubted, on the authority of Johnson, and was inclined to accept as an indication of serum-albumin any slight though sharply defined ring obtained by the contact method with cold picric acid solution and *clear* urine, not subsequently dissipated by heat. Recent experiments have shown me that mucin is occasionally present in non-(serum)albuminous urines in amount sufficient to respond to the picric acid test even so applied, and also to Millard's test, and to metaphosphoric acid. This is not, however, usual, as I have repeatedly failed to obtain any response to clear urine by the overlying method with plain or citrated picric acid, examining the tube even after several hours' contact. It is usual to obtain a mucin reaction to the boiling test with acetic and picric acid, which is improperly sometimes employed as a *delicate* test for serum-albumin. The slight cloud obtained with acetic acid and boiling, in urines not rich in salts, is undoubtedly often due to mucin, as can readily be proved. Fortunately little harm can usually result, in cases of suspected kidney disease, from the error of mistaking mucin for serum-albumin, since the presence in the urine of the former, with evidences of renal derangement, is often only the precursor of the latter, and probably arises from faulty metamorphosis of the cells of the renal tubules—of course, excluding vesical, urethral, and vaginal catarrh as a factor in its production.

With several years' steady use of the picric acid test, I still regard it as the most delicate reagent for the detection of traces of albumin, and, intelligently used, as the best of the many tests in use. Millard's phenic-acetic acid test I rank second, and frequently use. It must be recalled that this also, like picric acid, will respond to so-called peptones, to mucin, and to urates. Response, therefore, occurring with these, unless very decided and leaving no doubt as to its nature, requires confirmation by the method above suggested. Tanret's solution, and other tests with mercuric chloride and those with tannin, such as Sebelein's reagent, are unreliable for the detection of albumin because of other sources of error even than those just mentioned. The same may be said of the trichloracetic acid test.

[2] Glacial carbolic acid (C. P.), 95 per cent., ʒij; glacial acetic acid (C. P.), ʒvij; mix and add solution of potash, ʒij, ʒvj. Filter. The sp. gr. of this solution is 1027.

[3] Concentrated urines, rich in salts, will not yield mucin, if present, to a small amount of acetic acid. An excess of that necessary to form acetates with the salts present must be added before precipitation can occur. This is a practical point of great importance little attended to.

after agitation, was subsequently filtered and the filtrate exactly neutralized with strong (25 per cent.) NaHO solution.[1] The filtrate was then slightly acidulated with acetic acid, and the various tests above mentioned once more applied. Any indications of response now occurring, separate portions of the urine were further carefully tested with heat, with HNO_3, and often also with acetic acid and potassium ferrocyanide.

In all the microscopic examinations the centrifugal machine was employed to obtain a sediment, and usually from the precipitate taken from the urine which had been standing for some hours.[2]

Urea was estimated by the hypobromite process (bromine itself always being employed), with a modification of the Russell and West apparatus, which, as comparison with a tried and more complicated apparatus had shown, was very accurate clinically.

Uric acid was estimated by the method of Haycraft. Acidity, when taken, was estimated by titration with $\frac{N}{10}$KHO or NaHO. The chlorides were estimated as total chlorine by Volhard's method.[3] The figures indicating total urinary solids[4] in the tables are simply calculated in grains by multiplying the last two figures of the specific gravity by the number of ounces of urine passed in the twenty-four hours.[5] This method, of course, furnished only a very rough approximation, but used with coincident urea, or urea and chlorine estimations, it is all that is necessary. It alone may be made to furnish results of some clinical

[1] NaHO was used in preference to KHO, as an excess of the potash salt present in the urine would, in subsequently testing with picric acid, form a precipitate of potassium picrate, thus interfering with the reaction for albumin. A strong solution of alkali was used, so that if but traces of albumin were present the latter be not so diluted by addition of these reagents as to cease to respond to tests used for its recognition.

[2] Both the two-bottle milk-testing machine made by Messrs. J. E. Lonergan & Co., of this city, and the equally efficient, and for clinical work more practicable, smaller apparatus of Messrs. Queen & Co., were used. The utility of the centrifugal machine as an aid in the production of urinary sediment for microscopic work is great indeed. In my experience the deposit resulting is both richer in quality and quantity than that obtained by gravity. Clear urines showing little or no sediment after some hours' standing can be readily made to yield a precipitate by its use, and casts but scantily present in the sediment resulting from standing without its employment, which might not be found, can often readily be secured by the aid of this adjuvant to the production and concentration of a precipitate.

[3] Estimations of chlorides were made as probably the most important mineral constituent of the urine, and that which has been found diminished in cases of chronic nephritis.

[4] Normally, the total urinary solids excreted average about 65 gram., or 1000 grains. The daily amount of urine averaging 1500 c.c. (50 fl. oz.), and the sp. gr. = 1020, then $50 \times 20 = 1000$ grains or 66 gram. The average daily output of urea is between 30 and 40 gram. (450 to 600 grains), or about one-half the total solids, the amount varying considerably with sex, body weight (about 1 gramme should be excreted for each five pounds of body weight), and amount and character of food eaten.

Daily excretion of chlorides, calculated as NaCl, equals 10 to 15 gram. (154 to 246 grains), or somewhat less than one-half the urea. Calculated as chlorine, chlorides equal 6 to 9½ gram. The daily amount of uric acid excreted is very variously placed, the average probably being 0.5 gram (7 to 10 grains).

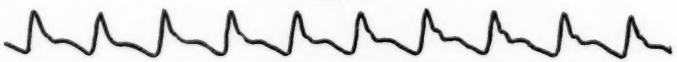
[5] This method is much more convenient and gives approximate results of greater accuracy than those obtained by the use of Christoson's (Haesen's) or Trapp's formula. It furnishes a figure midway between that of the two. By the former the last two figures of the sp. gr. are multiplied by 2.33; the resultant is multiplied by the total number of c.c.'s of urine passed This product divided by 1000 — the total amount of solids in grains. Trapp's factor is 2.

accuracy, provided the amount of NaCl excreted is also ascertained.[1] It is, of course, most essential that an accurate urinometer be employed and corrections for temperature made.

CASE I.—W. B., analytical chemist, aged twenty-nine years; unmarried; weight, 147 pounds. No history of lead, syphilis, or alcohol. Habits studious and temperate. No diseases of childhood. As a boy, robust. Family history as to renal or cardiac disease negative. His father has been a generous liver, and has had several attacks of typical gout. For the past three years W. B. has suffered from severe headaches and incapacity for exertion, worse in the latter half of this period. Constant headaches and muscular weakness have been present, increased by slight physical exercise or mental strain. Two years ago, during a period in which he was feeling particularly bad, his urine, examined by himself with nitric acid, showed the presence of albumin. This was discovered in a single unmixed specimen of the morning urine, and once only, though often afterward frequently examined for. An estimation then of the total urinary nitrogen excreted showed a considerable diminution from the normal. Fancying himself the subject of kidney disease, he shortly after this consulted at odd times several practitioners in this city, and, in the summer of 1892, Charcot, in Paris. These were unable to find either albumin or casts in the urine and gave on this account a negative opinion as to renal disturbance, though the symptoms certainly were suggestive of grave inadequacy. There was no improvement on the lines of treatment suggested, but rather an aggravation of symptoms. After a course of spinal and loin douching under Charcot, loin pain developed which is now present, with headache, vertigo, and general malaise on any extra exertion, or when a non-nitrogenous dietary is departed from. There is but little anæmia. Digestion is fairly good. No indications of external œdema have ever been noticed. There are no eye changes. I have had the case under observation about a year and a half. When first examined physically, shortly before this, persistent high arterial tension was noted, with accentuation of the aortic second sound at the apex. The area of cardiac dulness was not increased, nor has it since become so. The apex-beat is still in the normal situation, about two inches below and a half-inch within the nipple. Persistent high tension, without as yet signs of notable thickening of the arterial coats, has always existed since, except in the past three months, during which he has been on a strictly vegetable diet, eating no meat, meat soups, eggs, or fish. The influence of this diet upon symptoms and pulse tension is quite remarkable. Under it, if no extra physical or mental exertion is undertaken, very little headache, vertigo, or loin pain is felt.

The accompanying sphygmogram is one of several, all practically similar, taken at various times after having been between two and three months on a non-nitrogenous diet. It is practically a normal tracing, showing a moderate degree of tension.

FIG. 1.



W. B., June 10, 1893. Pressure, 1⅛ ounces; sitting.

Since the single occasion on which he detected albumin in his urine by nitric acid, two and a half years ago, very frequent observations, in both mixed twenty-four hours' specimens and that passed at various times in the day, have never resulted in showing the slightest trace to heat or to nitric acid. For a long time metaphosphoric acid was used in addition to heat and nitric acid, as a more delicate test for the recognition of small amounts.

[1] As my friend Dr. Leffmann suggests to me.

Though the tests with the last named were always resultless, a slight response was often obtained with metaphosphoric acid; but as mucin, also precipitated by this acid, was not eliminated as a source of error, minute traces of albumin may or may not then have been present, as they are occasionally now.

When urine is ordinarily pronounced albumin-free, it is meant, almost without exception, absent to tests commonly employed, such as heat and nitric acid, which, applied with care, detect albumin in small amount but not in minute traces (less than 1 to 100,000).[1] In the cases of granular kidney before referred to, such as those of Wilks and of Mahomed in which no albumin was found in the urine, heat and nitric acid were the tests probably employed for its detection.[2] In my cases the absolute absence of albumin was most usual, for during the period in which examinations were made, as a rule, reactions did not occur to tests (picric acid, the pheno-acetic acid solution) showing traces as minute as 1 to 200,000 to 300,000.

In the past year, besides examinations by the patient and by myself, with picric acid as the reagent, of a number of unmixed specimens, at short and more lengthy intervals—specimens passed at various times in the day, as regards food and exercise—I made careful daily tests of mixed twenty-four-hours' samples in the period named in the accompanying table, except when piperazin was taken. As a rule, not a trace of a response could be obtained with the untreated, clear urine overlaid with picric acid; occasionally a mucin response occurred, and, rarely, a ring which further treatment showed to be serum-albumin. No marked response was ever thus obtained to the picric acid or Millard's solution, and the results were always negative with heat and with nitric acid. In microscopic examinations, at various times, of specimens of the mixed urine, typical granular and hyaline casts, broad and narrow, were found on several occasions, but never in any amount, and only after some search. Cylindroids were also present. Besides a variety of epithelium, from the bladder and its accessories, and cells of undetermined origin, occasionally those typical of the convoluted tubules were seen in small number. Isolated pus-cells also were occasionally encountered. An abundance of calcium oxalate crystals were present in nearly all specimens, and often considerable free uric acid. Spermatozoa were occasionally seen. As a rule, the urine, of light amber color, yielded but little sediment, and in cool weather remained undecomposed longer than is common. But while piperazin was being taken, sediment was abundant and decomposition occurred early, as is usual. At this time but three microscopic examinations were made, and these were cursory. No casts were seen. There was an abundance of bacteria, calcium oxalate crystals, free uric acid, ammonium urate, and amorphous urates.

The following is an analysis of the most important constituents of the urine over a period of twenty-three days. Much more fluid was ingested than was

[1] I accept this limit of reaction, more extreme than is usually given, on the authority of Millard (Bright's Disease, 3d ed., p. 85).

[2] In a very courteous letter recently received from Dr. P. H. Pye-Smith, senior physician to Guy's Hospital, he informs me the tests employed by Dr. Mahomed were: 1. Heat, with the addition of acetic acid, to neutralize alkalinity, if present, and to neutralize any calcic phosphate precipitated by heat. 2. Cold nitric acid, carefully overlaid by the urine. Dr. Pye-Smith also says that, though other tests, such as ferrocyanide of potassium and acetic acid, acidulated brine, and picric acid, were employed from time to time in the hospital, in 1879 to 1881, the date of Mahomed's observations referred to, the tests by heat and by nitric acid only were those in constant use in the wards. Had other than these two been used by Dr. Mahomed in his observations, Dr. Pye-Smith remarks, Mahomed would have mentioned the fact in the Guy's Reports.

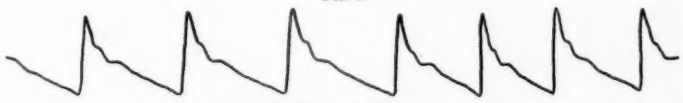
required to satisfy thirst, during the greater part of this time, in order to stimulate the kidneys to greater activity. Schering's piperazin, in doses of five grains four times daily, was tried for the same purpose for a period of a week. Apparently the only effect of the piperazin was to render the urine more readily decomposable, without markedly lowering acidity. The average daily quantity of urine passed in the twenty-three days (1085 c.c.) is in excess of that usually voided; polyuria has at no time existed. Prior to onset of symptoms of renal inadequacy, the urine had been of normal amount. Subsequently it was commonly diminished in quantity, and has remained so. Nitrogenous excretion during the twenty-three days, though in excess of that passed when analyses were made by himself some months previously, is considerably below (100 to 150 grains daily) what should be excreted by a healthy male adult in active life. Though on ordinary diet during this time, urea elimination was only about one-half the normal average of 35 grammes (18.56 grammes). The daily average ratio of uric acid to urea (1 to 26) is much lower than what is regarded as normal. In this case urea excretion being diminished and elimination of uric acid probably not being interfered with, the ratio would, of course, be less than the physiological figure of 1 to 40 or 1 to 50. The average excretion of chlorides (as chlorine) is considerably below normal. This, however, does not necessarily indicate impaired renal excretion, though the latter is probably here present, as other causes, notably gastric hyperacidity or hypersecretion, which, apart from renal inadequacy, produce similar diminution, are absent.

Date.	Daily average amount of urine in c.c.	Daily average amount of urine in fluidounces.	Color.	Specific gravity of mixed 24-hour specimens.	Degree of acidity calculated on 100 c.c. urine.	Daily elimination of urea in grammes.	Daily elimination of urea in grains.	Daily elimination of uric acid in grammes.	Daily elimination of chlorine in grammes.	Approximate daily amount of fluid taken.	Remarks.
1893											
Jan. 31	1740	58	Light amber.	1013	7	22.70	352	0.764	Not estim.	Over 4 pints	Meat diet throughout the 23 days.
Feb. 1	1650	55	"	1014	11	18.00	277	0.329	"	"	
" 2	1400	46 2/3	"	1015	18	20.00	308	0.950	"	"	
" 3	1390	46 1/3	"	1012	20	19.50	300	0.780	5.60	"	
" 4	950	35	Darker amber.	1021	20	19.00	292	0.729	4.20	1¾ pints	
" 5	920	30 2/3	"	1020	13	18.40	283	0.934	4.00	"	
" 6	770	25 2/3	"	1020	24	17.75	273	0.569	2.70	"	
" 7	1160	38 2/3	Light amber.	1015	15	21.00	323	0.779	3.50	2¼ pints	
" 8	} 1550	51 2/3	"	1016	...	21.75	335	0.989	6.37	"	
" 9											
" 11	931	31	"	1018	15	18.00	277	0.729	Not estim.	"	gr. xx piperazin taken. " " "
" 12	1130	37 2/3	"	1020	20	23.75	365	0.987	4.50	"	" " "
" 13	875	29	"	1021	20	17.50	269	0.666	3.50	"	" " "
" 14	700	23 1/3	"	.....	40	19.00	292	0.600	4.60	1¼ pints	" " "
" 15	850	28 1/3	"	1021	30	15.00	237	0.456	2.20	"	" " "
" 16	1025	34	"	1021	25	16.80	258	0.725	6.45	"	" " "
" 17	960	32	Darker amber.	1022	22	16.32	251	0.693	3.50	"	
" 18	1400	46 2/3	"	1021	20	19.60	201	0.700	7.10	"	
" 19	} 1025	34	Light amber.	} 1021	20	20.00	308	0.725	5.50	"	
" 20											
" 21	955	31 2/3	Darker amber.	1024	25	20.00	308	0.765	6.35	"	
" 22	1000	33 1/3	Light amber.	1021	18	22.00	338	0.924	5.25	"	

Average daily amount of urine passed, 1085 c.c., or 36 fluidounces.
" " " " urea excreted, 18.56 grammes, or 285.82 grains.
" " " " uric acid excreted, 0.713 gramme, or 11 grains.
" " ratio of uric acid to urea, 1 to 26.
" " amount of chlorides calculated as chlorine (18 days), 4.82 grammes.
Approximate daily average amount of total urinary solids, 43 grammes, or 666 grains.

CASE II.—J. B., aged thirty-one years; brother of Case I.; unmarried; best weight, 140 pounds. No lues; no lead-poisoning. Had slight attack of scarlatina when aged eight years; no complications attended it. Between the ages of eighteen and twenty occasionally drank a trifle to excess of beer and wine; but excess for him would be moderation in another of more robust build. He was easily affected by alcohol. Has been very temperate since twenty years of age. Has always been looked upon as delicate; was in best condition when roughing it on the plains four years ago. Began to visibly fail in health two years ago, shortly subsequent to a two weeks' vacation, during which he had indulged in a little mild dissipation incident to hotel life at a fashionable seaside resort. Lassitude, attacks of severe headache about vertex and nucha were first noticed. Spells of headache have since been frequent. Though these occur independent of exertion, they are especially induced by it, especially by a long walk, as is the case with the brother. More or less steady pain across the loins has been noticed for over a year. Accompanying it is a feeling of tired, weak back. During the past six months vertigo has frequently accompanied headache. These are often present on rising in the morning. Recently an attack of vertigo occurred in which he states that, though he did not lose consciousness, he felt "queer," and nearly fell. He was dazed afterward and was not himself for over two days. Digestion has never been above the average. Within the past year

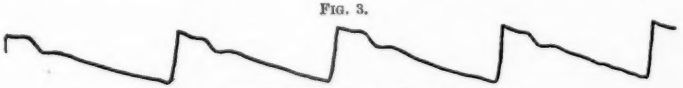
FIG. 2.



Pressure, 1½ ounces.

it has been impaired. He is flatulent, and nausea after meals is frequent. A stomach examination recently made showed motility lowered, with diminution in free HCl. The latter is probably usual. There is no venereal addiction, and no seminal losses occur. There are no cardio-vascular changes evident. Apex of heart is in normal situation. At the time of the first examination a systolic murmur was noticed, most distinct immediately below and to the left of the apex. It was also distinct in the axilla. It was inconstant, audible steadily for two or three minutes, and then not evident save

FIG. 3.



Pressure, 1¾ ounces. Pulse, 60.

with chest fixed in full inspiration. On each occasion the second sound at the apex was much accentuated. The murmur could not be distinguished when a cardiac examination was again (and last) made, several months after the first. There is no history of rheumatism. The pulse tension, when first under observation, was high. Later, after some time on a strictly vegetable diet, without meat, meat soup, fish, or eggs being eaten, it is quite normal, as the accompanying sphygmogram, one of a number similar, shows.[1] No tracings were taken before meat was abandoned.

Immediately after first sphygmogram was obtained, a meat diet was begun. Tracing second, taken one week later, indicates the effect of retained nitrogenous waste on the pulse. Meat then had been eaten somewhat freely once

[1] The upstroke is vertical, the tidal wave slight, and below a line drawn from the apex of the upstroke to the aortic notch (Mahomed's test of low tension). The pressure used was 1¼ to 1¾ ounces, a greater amount extinguishing the pulse, which was 74, taken sitting.

to twice daily. Other conditions which might modify the tracings were similar. This sphygmogram shows a typical high-tension pulse,[1] indicative of inadequate kidneys.

The eye-ground, kindly examined for me by Dr. Schneideman, shows nothing abnormal.

During the past two years the urine of different periods of the twenty-four hours has been frequently and carefully tested for albumin by heat, nitric acid, and metaphosphoric acid by the brother, who is a skilled chemist. A response has never been obtained to heat or to nitric acid. Occasionally, though more rarely than in Case I., a slight reaction has occurred to metaphosphoric acid and to picric acid; but mucin not having been eliminated, it is uncertain if the response was due to serum-albumin. Since February, 1893, the urine has been frequently tested by myself. The result has always been negative with heat and with nitric acid. On three occasions a reaction has been obtained with picric acid. In one of these only, was acetic acid used to remove mucin by the method before mentioned. On that occasion only, the untreated urine was also tested with Millard's solution. No trace of haziness or ring occurred, and after removal of mucin by acetic acid, no trace of response could be obtained with picric acid. Granular and hyaline casts have been found on several occasions. Hyaline were in excess of the granular, but even hyaline occurred only in small number, as in Case I. A few epithelia, the character of which indicated their probable origin from the convoluted tubules, were also occasionally encountered. Calcium oxalate crystals abounded in all specimens examined, whether the urine was examined immediately after voiding, or, as on some occasions, after standing twelve to twenty-four hours.

An analysis is subjoined of the most important constituents of the urine for a period of six days. The amount, specific gravity, and total daily output of nitrogen, frequently before estimated, tallies so closely with this that it may be accepted as a sample of the usual condition. These also agree, as do the clinical symptoms, with those of Case I. Uric acid elimination, however, in Case II. is somewhat higher than in Case I. The ratio to urea is 1 to 24.

Date.	Daily amount of urine passed in c.c.	Daily amount of urine passed in fluidounces.	Specific gravity of mixed 24-hour specimens.	Color.	Degree of acidity calculated on 100 c.c. urine.	Daily elimination of urea in grammes.	Daily elimination of urea in grains.	Daily elimination of uric acid in grammes.	Daily elimination of chlorides calculated as chlorine.	Daily elimination of total urinary solids in grains.	Approximate amount of fluid drunk in c.c.
1893											
Feb. 28	875	29	1026	Amber	34	13.88	200	1.0	6.75	654	800
Mar. 1	870	29	1028	"	30	14.00	215	0.646	6.50	832	800
" 2	900	30	1029	"	40	18.00	277	0.814	6.85	870	800
" 3	900	30	1030	"	Not cal.	22.50	346	0.740	7.40	900	800
" 4	900	30	1030	"	"	21.60	322	0.740	8.00	900	800
" 5	850	28½	1028	"	30	22.00	338	0.828	5.50	784	800

Average daily quantity of urine, 882 c.c., or 29½ fluidounces.
" " elimination of urea, 18.66 grammes, or 287 grains.
" " " " uric acid, 0.794 gramme, or 12 grains.
" " " " chlorides calculated as chlorine, 6.8 grammes.
Approximate average daily elimination of total urinary solids, 53 grammes, or 816 grs.

The following case is apparently of a type similar to the preceding, though of an age and with symptoms indicating a more advanced kidney

[1] The upstroke is less vertical, the tidal wave more pronounced, a portion of it occupying a position above a line drawn from apex of upstroke to aortic notch, which latter is placed high. Pressure from 1¾ to 2 ounces, no minor pressure tracing pulsations. Pulse 60; that and tracings taken sitting.

ailment. The patient came under observation while this paper was in process of preparing. I could not forbear reporting the case at this time, though not studied for a lengthy period, because of its suggestiveness. In the few days that opportunity has permitted seeing the case, it has been carefully studied. Whether the urine has been previously, as now, altogether albumin-free, or whether in the future this condition will continue, it is, of course, impossible to more than conjecture. But that it should be so now, when marked renal incompetence and symptoms referable thereto are present, renders it well worthy of mention in connection with the other cases:

CASE III.—J. MacC., aged fifty-five years; married; weight 150 pounds; stationary engineer. No history of lead, syphilis, or alcohol. First seen June 11, 1893. About a year before, he had been much overworked and had what was regarded as a slight attack of influenza. He had had no severe ailment prior to this and had always been robust. During the past nine months he had visibly failed in health. There was increasing general muscular weakness and incapacity for exertion. Generalized headache was common, and, lately, had increased in severity; it was worse toward afternoon and at night, and was associated with sleeplessness and, on rising in the morning, with vertigo. The bowels were always inclined toward constipation, but had been maintained in a soluble condition by aperients. No other digestive disturbance was present. Tongue was moderately clean. Appetite was poor. Shooting pains occasionally occurred about the body. No indications of œdema were present, nor had there ever been, so far as he could tell. Knee-jerk, station, and tactile sensation were normal. Some tremor of lips and rather pronounced of hands on extending the latter, were remarked. Temporals are prominent and radials tense, but the arterial wall was not more than slightly appreciable to the finger when emptied above by pressure. The pulse was small and gave the suggestive tracing of high tension, shown in the accompanying sphygmogram.

FIG. 4.

J. MacC. Pressure, 1¾ ounces; sitting.

The second aortic sound was markedly accentuated at the apex, but the heart's impulse was normally placed within the linea mammalis. Both palpation and percussion showed no cardiac hypertrophy. He habitually passed but a moderate amount of urine, never rising at night. The color, so far as he had noticed, is never very light.

His condition at the first visit, when the above symptoms were noted, suggested either plumbism or chronic Bright's disease. But as there was no blue line, history of colic, or other suggestive symptoms of the former, and as he had not worked at the branch of his trade for a year or more which necessitated handling lead, and no other source of exposure was evident, I informed him, on his asking for an opinion as to the nature of his ailment, that I felt confident the seat of the trouble was in the kidney. I then had him send the total twenty-four hours' urine. To my surprise not a trace of albumin could be detected by any test, even the most delicate. The urine was of normal, yellowish-red color, not resembling that of a case of contracted kidney. This, with freedom from albumin and a history of no nocturnal bladder disturbance, was misleading, and had I not been on the watch for such obscure cases and noted that not only the amount of urine but of urea was considerably subnormal, I might have been longer in arriving at an accurate diagnosis.

Careful consecutive daily examinations of the twenty-four hours' urine for albumin have been made up to the present writing. The urea, uric acid, chlorides, etc., were also calculated for a period of eleven days. Albumin, examined for daily, has at no time been present, even in the minutest trace. On two consecutive days, when the urine was especially concentrated and the weather excessively warm, a slight ring occurred with picric acid and a trifling cloud with Millard's reagent. But this was undoubtedly mucin. A second specimen treated with acetic acid,[1] filtered and neutralized with strong NaHO, and then again slightly acidulated, gave no trace of response to these tests, even after standing several hours. Considerable mucoid sediment was always present in the urine after it had stood for some hours. Two microscopic examinations were made and two to three hours occupied on each occasion. In the first examination a medium-breadth hyaline and a narrow granular cast were found. An aggregation of small cells forming a somewhat irregular-shaped epithelial cast was also seen. Free uric acid was present in large amount; calcium oxalate crystals and a few leucocytes were also noted. On the second occasion a sample of mixed urine of two days was used. A number of narrow and broad hyaline casts (eight to ten) were found. Cylindroids, amorphous urates, free uric acid crystals, a few small round and oval nucleated cells with granular contents were also present, but no calcium oxalate.

Date.	Daily amount of urine in c.c.	Daily amount of urine in fl.oz.	Sp.gr.of mixed 24-hour specimen.	Color.	Daily elimination of urea in grammes.	Daily elimination of urea in grains.	Daily elimination of uric acid in grammes.	Daily elimination of chlorides in grms. calculated as Cl.	Approximate daily elimination of total urinary solids in grains.
1893									
June 12	870	29	1013	Reddish yellow	12.25	188	Not estim.	Not estim.	377
" 13	670	22	1013	"	8.78	135	0.185	1.80	289[2]
" 14	520	17⅓	1026	"	13.00	187	0.349	4.42	350
" 15	500	16	1016	Yellow	6.50	100	0.168	2.15	256
" 16	410	13½	1013	Reddish yellow	8.20	126	0.134	1.57	178
" 19	760	25	1011	Yellow	10.64	163	Not estim.	Not estim.	270
" 20	670	22	1010	"	6.70	103	0.268	1.68	220
" 21	810	27	1022	Reddish yellow	19.20	200	0.379	5.00	590
" 22	570	19	1028	Deep reddish yellow	12.50	192	0.400	4.33	532
" 23	450	15	1029	"	12.15	186	0.287	2.75	435
" 24	850	28	1017⅓	Light yellow	17.00	261	0.340	4.00	485

Daily average amount of urine in the 11 days, 643 c.c., or 21½ fluidounces.
" " " " urea in the 11 days, 11⅓ grammes, or 177 grains.
" " " " uric acid (9 days), 0.29 gramme, or 3¼ grains.
" " " " chlorides estimated as Cl (9 days), 3 grammes, or 46 grains.
" " " " total urinary solids, 23½ grammes, or 362 grains.

The total daily output of urine and total urinary solids in this case are much diminished. Urea is especially low.

After the eleven daily observations were made, during which the bowels were moved once daily by laxatives, ʒj, three times daily, of potash bicarbon-

[1] See foot-note 1, p. 660.

[2] Exact estimation of the total urinary nitrogen eliminated on the 13th and 14th instant, was kindly made for me by Dr. Leffmann by the Kjeldabl-Gunning method, to compare the results thus obtained by the more ready appoximate method for ascertaining total urinary solids. The figures are: 13th inst., 18 grammes or 277 grains; 14th inst., 28 grammes or 431 grains.

ate, taken effervescing with lemon-juice, was prescribed, with excellent effect, as a diuretic. This, and free purgation by calomel every third day, caused a prompt amelioration in symptoms. The pulse tension, however, continued raised, though not so markedly as at first. The accompanying tracing was

FIG. 5.

J. MacC. Pressure, 2¾ ounces; sitting.

taken fifteen days after the preceding one, and two days after beginning the potash. He had then been for a week on a vegetable diet. The pulse volume is greater than in the first tracing, with a prominent pre-dicrotic wave. Uric acid was then probably in excess in the blood, and nitrogenous excretion greater than before. The diuretic, mercurial laxatives, and non-nitrogenous diet being continued, recently pulse tension is considerably lower than before, with amelioration in symptoms.

The following is the report of the eye examination in this case, furnished me by Dr. Schneideman: "Vision just short of normal. Fields of normal extent for form and color. Right eye: Nerve-head reddened and somewhat hazy; outlines indistinct; marked venous pulse; maculæ normal. Left eye: Not essentially different from right. I think that the nerves are redder and more hazy than is ordinarily met with in conditions of the refraction as noted."

The accompanying case is very similar clinically to the preceding. It was recently seen in consultation with Dr. Lewis Brinton, who has kindly permitted me to report it here. From the absence of albumin, though the symptoms were suggestive of chronic Bright's disease, Dr. Brinton had been somewhat inclined to doubt this diagnosis which he has made, and sought my aid for a verification.

CASE IV.—Mrs. M., aged fifty-one years; weight about 110 pounds. Throughout her life the patient had been subject to headaches, but during the past seven years frequent spells of another character occurred. The ache is in the occiput and nucha. It comes on more often on rising, once in about five days. During the past four or five years she has had backache and loin pain; is tired on slight exertion. Occasionally puffiness about eyes has been noticed. She is very nervous. Appetite is poor. No marked digestive disturbances exist; no vomiting. Pulse shows raised tension, but no thickening of arterial coats. No cardiac enlargement exists. Heart was noted to be irritable. A distinct apical non-transmitted systolic murmur was heard in the early part of the first examination. This was evidently due to temporary incompetence. It could no longer be heard at the end of a half-hour, during which she had been sitting quietly. Dr. Brinton had not noticed it before this examination that we made together. Second sound was accentuated at the apex, more distinctly so when the murmur ceased to be heard.

She stated that she had been passing but about a pint of urine daily for some years. Could not recall ever passing a large amount, but may have averaged three pints some years ago. The specific gravity of a number of specimens examined by Dr. Brinton ran between 1012 and 1020. Dr. Brinton could never discover even traces of albumin, though he had frequently examined the urine. The specimen examined on the day of consultation was of amber color, specific gravity 1021, and gave no reaction with heat or nitric

acid, but a ring occurred with picric acid not dissipated by heat. It is impossible now to state if this reaction was due to serum-albumin or to mucin. The urine was concentrated, and but a few drops of acetic acid were added, entirely too little to precipitate mucin in presence of excess of salts.

A number of other examinations were made, a response occurring only on one other occasion to picric acid, and never to heat and acetic acid, or to nitric acid. But one microscopic examination was made. In this a considerable number of hyaline casts were seen, and one granular cast studded with minute oil globules. There were also present cylindroids, a few leucocytes, a few red cells, and several small, finely granular, nucleated polyhedral cells of apparent renal origin.

The elimination of urea, uric acid, and chlorides in this, as in the preceding case, is much below normal. Estimations could only be made over a period of a few days, but as the urine is believed to vary little in quantity, the averages here given are believed to probably represent the usual condition.

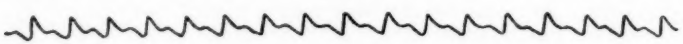
Date.	Daily amount of urine in c.c.	Daily amount of urine in fl.oz	Sp.gr. of mixed 24-hour specimen.	Color.	Daily elimination of urea in grammes	Daily elimination of urea in grains.	Daily elimination of uric acid in grammes	Daily elimination of chlorides calculated as Cl. in grammes.	Daily elimination of total urinary solids.
1893									
Apr. 27	480	16	1016	Yellow	7.00	107	0.32	2.18	256
" 28	540	18	1021	Reddish yellow	9.00	141	0.23	2.90	378
" 29	420	14	1020	"	8.40	136	0.25	1.75	280
" 30	540	18	1027	Yellow	8.60	132	.....	.....	486

Average daily quantity of urine on 4 consecutive days, 500 c.c , or 16 ounces.
" " " " urea on 4 consecutive days, 8¼ grammes, or 127 grains.
" " " " uric acid in 3 days, 0.26 gramme, or 4 grains.
" " " " chlorine in 3 days, 2.3 grammes, or 35½ grains.
Approximate daily quantity of total urinary solids, 22¾ grammes, or 350 grains.
Ratio of uric acid to urea, 1 to 31.

The next case, V., also resembles the foregoing. She was first seen during last May in the dispensary of the Episcopal Hospital. Since then she has been constantly under observation, for a time in the wards of the hospital.

CASE V.—Miss R. L , aged seventeen years, of delicate build; weight, 110 pounds. The symptoms of her ailment first noticed were that for the past two years there has been almost constant loin pain, with frequent spells of vertigo and headache. She was losing strength and was unable to attend to daily duties. There was anorexia and a feeling of weight in the epigastrium after meals, and constipation. When aged six years had had scarlatina, during the subsidence of which slight general dropsy occurred, lasting about a week.

FIG. 6.



R. L. Pressure, 2½ ounces; sitting.

When first seen she was of anæmic appearance. For a year or more she had not been getting the proper sort or amount of food because of the straitened circumstances of her people. An examination showed no cardiac hypertrophy. The first sound of the heart was distinct at the apex and the second

was there accentuated. The pulse was rapid, and furnished the subjoined tracing, one of several, all showing a similar condition of low tension and well-marked dicrotism with the aortic notch low.

Fig. 7 shows a tracing taken three weeks later, after a week spent in recumbency in hospital on soft diet (chicken once daily). In this tracing it

FIG. 7.

R. L. Pressure, 2 ounces; sitting.

will be noticed that tension is higher, the pre-dicrotic as well as the dicrotic wave being quite well marked. Rest in bed and a more wholesome diet had evidently increased arterial tone.

During the two and a half months that she was under observation no drugs were given; a mild laxative was prescribed. An accurate record was kept of the daily quantity of urine for over one month. The average was 550 c.c. (eighteen fluidounces). More or less loin pain, and spells of headache and vertigo continued throughout this time. These symptoms have since ameliorated somewhat under free purgation and large doses of potassium citrate, the last given to stimulate diuresis.

The urine in this case always deposited considerable mucoid sediment, and a reaction was obtained on three occasions to picric acid, and on two a slight cloud was evident on cooling after boiling a specimen slightly acidulated with acetic acid. This was evidently due to the presence of mucin, as a specimen subsequently treated with *excess* of acetic acid, in the manner before described, gave then no trace of albumin response to any test.[1]

In three microscopic examinations casts were found on two occasions, once by Dr. Frank Massay, who kindly made an examination for me. Dr. Massay noted pale granular and hyaline cylinders of medium breadth, and cylindroids. In a later examination by myself, broad and narrow hyaline casts only, were seen. Calcium oxalate crystals were present in very large quantity in all examinations.

The figures in the accompanying table indicate that urea elimination in

Date.	Daily amount of urine in c.c.	Daily amount of urine in fl.oz.	Sp.gr. of mixed 24-hour specimen.	Color.	Daily elimination of urea in grammes.	Daily elimination of urea in grains.	Daily elimination of uric acid in grammes.	Daily elimination of chlorides calculated in grms. as Cl.	Daily amount urinary solids in grains.
1893									
Apr. 30	400	13	1031	Reddish yellow	14.40	221	Not estim.	Not estim.	403
May 16	400	13	1029	"	15.00	225	0.3	2.38	377
" 17	380	12⅘	1031	"	10.00	154	Not estim.	2.00	395
June 11	440	14⅔	1031	"	16.75	255	"	Not estim.	352
" 12	470	15⅔	1032	"	22	338	"	"	500
" 13	480	16	1033	"	18.25	280	"	"	528

Average daily amount of urine in the 6 days recorded above, 430 c.c., or 14 fluidounces.
" " " " urea in the 6 days, 16 grammes, or 246 grains.
Approximate daily amount of total urinary solids in the 6 days, 27 grammes, or 424 grains.

[1] This case has, of course, been under observation for too short a time, and too few examinations for albumin have been made to permit it, like Cases III. and VI., to be more than suggestive. Albumin may only have been absent for a time in the course of the chronic malady from which she is undoubtedly suffering. It is, however, significant that with small amounts of urine, with the presence of casts, and symptoms indicating renal incompetency, albumin was at least *then* absent.

this case is considerably diminished. The average daily amount for her weight should be about 350 grains, against the 246 noted. But one examination for uric acid was made. This (4½ grains) showed diminution. Chlorine elimination, too, as shown in the two examinations, is considerably below the normal, which would account for the ratio of urea to the daily amount of total solids being less than the usual one-half.

The next case is interesting in that, with few symptoms suggestive of chronic Bright's disease, renal degeneration in all probability exists. It was seen through the kindness of Dr. de Schweinitz, under whose care the patient was for failing vision. A renal ailment was not especially suspected by Dr. de Schweinitz, who had examined several specimens of urine for albumin with negative result. A cause for the symptoms—"chronic headache, with a curious form of optic neuritis in one eye and some degeneration in streaks in the other," as reported to me by Dr. de Schweinitz—not being apparent, he had sent the total twenty-four hours' urine to me for examination. On the urea being found somewhat diminished and casts being detected in the urine, I was permitted, through the courtesy of Dr. de Schweinitz, to see the patient on several occasions and to make further examinations of the urine.

CASE VI.—Mrs. T., aged fifty-one years; widow; seamstress; weight, 150 pounds. Had influenza two years ago. Following that has been subject to severe headaches, chiefly about vertex and frontal region. Has been subject to vertigo for a number of years. At times it is so severe that she has almost fallen with its occurrence when on the street. She has had more or less loin and sacral pain for some years, aggravated by being much on her feet. A tendency to constipation has always existed. No other symptoms are present save that eyesight began to fail unaccountably some months ago. That, lately, has improved under Dr. de Schweinitz's treatment. She never has passed large quantities of urine. Cannot recall how long the small amount now voiding has been habitual.

A cardiac examination showed a strong first sound and a highly accentuated apical second sound. No enlargement was detectable. Apex-beat was in normal situation. Pulse tension was high, but after radial was emptied by pressure, arterial wall scarcely distinguishable. Temporals not prominent. Considerable pressure necessary to develop tracing, but sphygmograms taken with from 2¾ oz. pressure up to 3¾ oz. similar; 4 oz. causes rounding of apex of upstroke. The accompanying tracing, with which others,

FIG. 8.

Mrs. T. Pressure, 3¾ ounces; sitting.

taken with the same degree of pressure, on this and other occasions are similar, is very significant, and by it alone a diagnosis of probable renal degeneration might be made. Though there is no history of lues, and nothing to definitely indicate a present or past infection, Dr. de Schweinitz is inclined to regard the eye condition[1] as of *specific* origin, especially since improvement

[1] Dr. de Schweinitz's report is as follows:

"Central vision, after the correction of an astigmatism, 6/6; field of vision for form normal, slightly contracted for colors. In the right eye iris somewhat sluggish to the reactions of light and shade; moderate optic neuritis, the apex of the swelling being 1 D. above the level of the surrounding eye-ground, the grayish swelling being chiefly confined to the disk; no hemor-

in this has been decided while on anti-luetic treatment. However that may be, there is little doubt that an underlying kidney ailment is contributory to certain of the symptoms.

There were indications of albumin to picric acid in the first specimen of urine examined, acetic acid not being used to separate mucin. The urine was concentrated, and deposited, after a few hours' standing, a heavy cloud of mucus and oxalates, to the former of which the reaction may have been due. No response of any sort occurred with subsequent specimen. But one specimen was examined microscopically. Several hours' search of five slides revealed three typical granular casts, one long, very typical waxy cylinder and a number of pale, broad hyaline casts. There were also present small polyhedral nucleated granular cells, bladder and vaginal epithelium, a few leucocytes and red disks, and a profusion of calcium oxalate and uric acid crystals.

The urea elimination in this case is more diminished than is that of the preceding. The amount calculated for body-weight should be from 400 to 450 grains, while there is actually excreted but about one-half this, or 230 grains. The total urinary solids excreted do not much exceed what the figure for urea should be were the renal tubular structure doing full work.

Date.	Daily amount of urine in c.c.	Daily amount of urine in fl.oz.	Sp.gr. of mixed 24-hour specimen.	Color.	Daily elimination of urea in grammes.	Daily elimination of urea in grains.[1]	Daily elimination of uric acid in grammes.	Daily elimination of chlorides calculated in grms. as Cl.	Daily amount total urinary solids in grains.
1893									
May 5	480	16	1031	Reddish yellow	16.80	258	Not estim.	Not estim.	496
" 10	553	18	1030	"	15.00	237	0.57	5.50	540
" 11	490	16⅓	1030	"	14.00	215	0.43	3.80	490
" 12	465	15½	1030	"	15.00	225	Not estim.	2.19	460
" 13	500	16⅔	1030	"	15.00	225	0.50	Not estim.	500
" 14	470	15⅔	1032	"	14.00	215	0.40	4.11	470

Average daily amount of urine, 500 c.c., or 16⅔ fluidounces.
" " " " urea, 15 grammes, or 230 grains.
" " " " uric acid, 0.47⅛ gramme, or 7⅛ grains.
" " " " chlorine, 3.90 grammes.
Approximate average daily amount of total solids, 32 grammes, or 493 grains.
Ratio of uric acid to urea, 1 to 31⅛.

In addition to the foregoing cases, through the courtesy of Dr. Charles A. Oliver I am able to report one, followed to its termination, in which albumin was evidently totally absent from the urine throughout the course of the disease. This case was originally sent to Dr. Oliver for an eye examination. No suspicions of renal trouble had been entertained until the fundal changes were noted.

rhages or splotches. In the left eye, a vertically oval optic disk, gray in its deeper layers, the upper and lower edges hidden and the nasal edges veiled; a patch of atrophic retino-choroiditis up and out from the papilla, numerous glistening reflexes in the macula, and above the fovea some dark radiating streaks, apparently in the retina. Under the influence of iodide of potash and bichloride of mercury, in dose of 5 grains and 1-24th of a grain respectively, three times a day, the appearances of the eye-grounds steadily improved, and at the last visit, May 23, 1893, one month after instituting the treatment, the disk upon the right side was less swollen, the temporal edge being visible. The disk upon the left side had improved in appearance, but there was no change in the patch of choroiditis or in the macular lesions."

[1] The urea determinations in this case were kindly made for me by Dr. Leffmann.

Dr. Oliver has furnished me the following note of this case:

"Miss X., aged nineteen years, an apparently strong and healthy girl of refinement and education, without any hereditary taint, was sent to the writer by her attending physician for recurrent frontal cephalalgia, associated with muscular and accommodative asthenopias. Careful examination of the fundus oculi showed the existence of a few faint flecks and dots in each macular region. So highly significant of renal disease were these changes, that the medical adviser was warned as to their nature. Repeated chemical and microscopic examinations of samples of urine, voided at different hours of the day and under varying conditions, up to within one week of her death (the last examination), failed to reveal either to her physician, the writer (Dr. Oliver), and more competent authority, any albumin, tube-casts, or other characteristic organic or mineral excreta—the specific gravity always remaining about normal. In spite of these negative results, low grades of neuro-retinitis, with and without fine spray-like hemorrhagic extravasations, came and went, until in about seven months after her eye-grounds were first studied, a uræmic attack suddenly appeared after exposure to cold, resulting in coma and death. Post-mortem examination revealed the presence of granular kidneys, with cardiac hypertrophy.

"In reference to your inquiry as to the tests for albumin employed, I would state that, in every instance in which I examined the urine, the specimen was filtered and boiled, followed by the careful and slow addition of either nitric acid or acetic acid; this method was invariably followed by Heller's test, both by superimposing the urine upon the acid, or allowing the acid to flow drop by drop beneath the urine along the inclined test-tube. In quite a number of instances I supplemented this by the application of heat, proving the presence of acid urates, which I afterward confirmed by the microscopic appearances of the ordinary six-sided rhombs. The specific gravity in some of these latter specimens, I remember, was somewhat high—1024.

"The specific gravity of the urine never fell below 1016, and 1024 was the highest."

Since beginning this investigation specimens of urine have been submitted to me from several cases of undoubted chronic Bright's disease in which the accompanying symptoms and the presence in three of so-called "albuminuric" retinitis had rendered the diagnosis very clear. In these, changes in the fundus were present in all, and considerable hesitancy had been felt by the medical attendants in accepting the opinion of the oculists as to the probable renal nature of the retinal condition, because of the absence of albumin. In two of these cases albumin had been frequently examined for by heat and by nitric acid, over a long space of time, but never found; and casts had not been detected, save a single hyaline cylinder on one occasion in the urine of one of these. These examinations of the urine had not been made for some time when daily specimens of the twenty-four hours' urine were submitted to me. Examinations for urea and uric acid over some days, as in the preceding cases, were instituted, the result of which need not be detailed here. In one, a senile case, passing scanty, light-colored urine, of low gravity, out of five specimens of the mixed twenty-four hours' urine examined, response for albumin occurred twice; on one of these occasions to acetic acid and potash ferrocyanide, and, slightly, to heat and acid—these two tests were then the only ones used. No casts could be detected in two exam-

inations, no sediment being obtainable even with the employment of the centrifugal machine.

In the other case, under the care of the same physician, out of eight specimens examined on different days, response to albumin occurred twice; on one occasion only to the more delicate tests, and on the other slightly also to heat. Epithelial and granular casts were found in the urine of this patient. Since these examinations the physician reports detecting albumin on a single occasion by nitric acid, and also by heat. Because of the even occasional presence of albumin in these cases I have not included them in my list. Both pass a diminished amount of urine, but are without dropsy. Slight uræmic symptoms are present. The arterial tension in both is habitually high. In one, cardio-vascular changes are present. In the other, aged but thirty-two, no arterio-sclerosis exists.

One other case of which I have notes, in which retinal changes occurred without albuminuria, is interesting and may here be briefly referred to. This I recently saw through the courtesy of Dr. L. Wolff.

Symptoms of digestive disturbance had at first alone been complained of. For these, the patient, a woman aged fifty years, was treated by Dr. Wolff. Subsequently, when not under the Doctor's care, her eyesight began to fail markedly. She then sought the eye dispensary of St. Agnes's Hospital for relief. The attendant there told her the trouble was renal, advising her to seek her physician, that her urine might be examined. Repeated search was then made by Dr. Wolff for albumin, without result. Examinations were then also made by the oculist, who was unable to understand the absence of albumin with such symptoms. It is needless to state that his search at the time of Dr. Wolff's examinations was also resultless. Later, Dr. Wolff lost sight of the case, but recently sought her out for my benefit. We found her suffering with pyelitis, which prevented the further study of the kidney condition from the point of view of absent albumin.[1]

As to the probable pathological nature of the kidney lesion in the preceding cases the histories of which I have detailed, little more than conjecture is possible. Clinically, they form a very similar class of various stages of a common ailment. Three of the six are young adults, and three in middle life. All present certain common symptoms which are referable to derangement of the renal functions, such as headache, vertigo, loin pain, high-tension pulse, diminution in the amount of urine, and in the most important of its constituents; the presence of casts, hyaline, granular, and waxy, and of isolated renal epithelia; the absence of albumin and of dropsy.

Detectable cardiac enlargement, hypertrophy, or dilatation, is absent in all, and thickening of vessel wall is recognizable in but one (Case III.), although raised arterial tension, save on a strictly non-nitrogenous diet, is habitual in all save Case V.

[1] Dr. Wolff informs me, as this paper is going to press, that she recently died suddenly. No autopsy was obtained.

It may be said that the assemblage of symptoms presented by these cases, is typical of no distinct form of chronic nephritis, though their trend is suggestive of granular or cirrhotic kidney, or of the form described by Delafield[1] in his pathological classification of renal disease, as chronic diffuse nephritis without exudation.

The only form of chronic Bright's disease of which we have knowledge in which the urine may be persistently albumin-free, is this or the red, granular or cirrhotic kidney. Yet several, as regards age and absence of cardio-vascular changes, and all as regards diminution in the amount of urine habitually passed, with coincident more or less marked diminution in elimination of urinary solids and especially of urea, do not respond to the type of so-called fibroid kidney. But that fibroid changes are present in the kidney in all, accompanying whatever other alterations that may exist, there is probably little doubt.

As regards epithelial involvement, the absence of albumin, of dropsy, and of epithelial casts, are against any extensive affection of the tubules; yet the presence in the urine in all of tubular epithelium, of granular, numerous hyaline, and, in one, of waxy casts, and the marked diminution of urinary solids, indicate some involvement of these parts, though perhaps not as yet to a degree more than what may be termed *functional.*

Glomerular nephritis of pronounced type is quite impossible without albuminuria, yet glomerular changes, of the nature of thickening of capsules of tufts and of vessels, are not improbable,[2] and may account for diminution in amount of urine, a symptom in all, and especially in Case V., a young girl in whom scarlatinal dropsy occurred when aged six years, and in whom also, now, slight ephemeral disseminated œdema of the skin occasionally occurs.

Little further comment need now be made on these cases, the purpose of this paper not being subserved by mere speculation. It is not claimed for them that the urine is perpetually albumin-free, or that it will remain so to the end, as in Dr. Oliver's case. The present report is intended but as preliminary, to direct attention to a very similar class of cases of chronic Bright's disease apparently of not uncommon occurrence, in which during the period of observation albumin has been invariably absent to ordinary tests, and usually to those most refined—at a time, too, when marked indications of renal derangement have been evident.

Subsequently a further report on these cases will be made, with such others similar as I may be able to encounter and study. My one object now, to which all other thoughts are subordinate, is to direct especial

[1] AMER. JOURN. MED. SCIENCES, October, 1891.

[2] Mahomed believed that absent albumin in certain cases of chronic Bright's disease may be due to thickening of vessels of Malpighian tufts, through which it is difficult for albumin to transude; and also to thickening of the capsules of the tufts, preventing distention of vessels; and again, though less often in chronic Bright's disease than in acute, to protective contraction of the renal artery.

attention to this class of cases, the pathological classification of which will readily come when they obtain general recognition clinically.

The most important teaching of this paper, to which all should give heed, is that there is no doubt that but little stress can be laid on the mere absence of albumin from the urine in rejecting or confirming a diagnosis of chronic Bright's disease; that in any instance in which an examination for albumin is demanded as a part of an investigation to detect or exclude kidney disease, no decided opinion dare be ventured as to the absence of the latter without further search of the urine, to determine not only the mere presence or absence of morphological kidney elements,* such as casts or epithelium, but also to discover the condition of the secretory renal function. As the latter can only be determined by an examination of a mixed twenty-four hours' specimen of urine, the total daily amount passed must be known. It should, therefore, be a rule, admitting of no deviation, in all cases of suspected Bright's disease in which albumin is undetectable in a single unmixed specimen, to obtain that of the total of one or, better, a consecutive series of twenty-four hours. Then, too, when albumin is absent in a single unmixed specimen, it may sometimes be discovered in that of the total twenty-four hours, when the more delicate tests are intelligently employed.

2620 N. Fifth Street, Philadelphia.

TUBERCULOSIS OF THE NASAL MUCOUS MEMBRANE; WITH A REPORT OF TEN NEW CASES.

By Maximilian Herzog, M.D.,

LARYNGOLOGIST AND OTOLOGIST TO THE GERMAN HOSPITAL, CINCINNATI, OHIO; LATE ASSISTANT TO PRIVAT-DOCENT DR. OTTO SEIFERT'S UNIVERSITY POLYCLINIC FOR THE DISEASES OF THE NOSE, BUCCAL CAVITY, AND THROAT, AT WUERZBURG.

Less than two decades ago tuberculosis of the nasal mucous membrane was a subject almost unknown to medical writers and observers. Men of such extensive experience as B. Fraenkel and Sir Morell Mackenzie confess that they have never seen a case. The former (see[1], bibliography) states that he thinks "tubercular ulcerations in the nose are of the utmost rarity," while the latter[2] admits that he probably has overlooked some cases of tuberculosis of the nasal mucous membrane among those

* Nor should these be excluded until a search of sediment, obtained by the use of the centrifugal machine, is made. Notwithstanding it is accepted that the mere presence of hyaline and granular casts, though highly suggestive, is not pathognomonic of an actual coarse kidney lesion, their presence in the urine always indicates at least functional disturbance of the kidney; and when not due to alterations in blood-pressure (congestion and associated albuminuria) and when accompanied by the presence in the urine of renal epithelium, or when associated with symptoms of renal inadequacy and persistently raised blood-pressure, it may be safely asserted that chronic nephritis exists.

many thousands of cases of laryngeal phthisis which he has seen. During the last ten or fifteen years, however, our knowledge of tuberculosis of the nasal mucous membrane has been extended by a number of contributions, which become more frequent the more our attention is directed to this affection. Richard von Volkmann,[3] the celebrated German surgeon, from his clinical observations and from theoretical deduction, stated that he believed that a number of tubercular affections of the nose are generally overlooked, or rather incorrectly diagnosticated. He points out that certain forms of ozæna believed to be due to congenital lues are most probably of a tubercular nature. Hajeck[4] was the first who succeeded in proving this assertion of Volkmann, by finding tubercle bacilli in the granular masses removed in cases of nasal affections which presented such clinical features that they would—without the bacteriological investigation—have been classified under the head of ozæna. It even looks as if tuberculosis of the nasal mucous membrane is not confined exclusively to the human race, and that we may eventually find it among the monkeys, who, as is well known, are very susceptible to pulmonary tuberculosis. Shurly[5] reports such a case of probable nasal tuberculosis in a monkey.

If we collect all cases of tuberculosis of the nasal mucous membrane reported in medical literature up to date, the total number, compared with the enormous number of other tubercular affections in other parts and organs of the human body, appears very small. Undoubtedly the nose is an organ which possesses a high degree of immunity against the tubercle bacillus. While the nasal mucous membrane is not endowed with an absolute and universal resisting power against each and every pathogenic micro-organism—we may here only mention how frequently it is attacked in the course of true bacillar and in streptococci diphtheria—it is, on the other hand, by no means immune against Koch's bacillus exclusively. There are very few well-authenticated cases of gonorrhœa of the nasal mucous membrane on record. Ricord has never seen one, and Diday, who has experimentally tried a large number of times to inoculate the nose with gonorrhœal pus, has failed without exception to produce a gonorrhœa of the nose.

Cornet[6] has shown that it is the dried and pulverized sputum of phthisical patients which furnishes the source of infection for tuberculosis of the lungs, by being inhaled into the respiratory tract. The parts which necessarily in normal respiration come in contact first with the tubercle bacilli inhaled are the nasal mucous membranes. Still, tuberculosis of these structures, not only as a primary disease but also as a secondary affection in phthisical subjects who expectorate hourly millions of bacilli, and consequently are constantly exposed to auto-infection, is a rare condition. Hildebrand,[7] by animal experiments, has demonstrated how important a factor the nose is in preventing micro-organisms from penetrating

into the lower parts of the respiratory tract. He compelled two rabbits of equal size to breathe, for three-quarters of an hour, air impregnated to a moderate degree with spores of aspergillus fumigatus; one rabbit was allowed to breathe *per vias naturales*, while the other one, whose mouth and nose had been closed up, was compelled to breathe through a canula introduced into a tracheotomy wound previously made. When a post-mortem was held on both rabbits, four days later, it was found that the two upper lobes of the right lung, and one upper lobe of the left lung of the animal on which a tracheotomy had been performed, showed the characteristic hepatization due, as first shown by Lichtheim,[8] to the invasion of the micro-organisms used in this experiment, while both lungs of the rabbit which had been allowed to breathe *per vias naturales*, through the nose, were perfectly free from any pathological changes, and could be inflated perfectly, like any other apparently normal lung.

Hildebrand, from these and other experiments, concludes that the micro-organisms suspended in the air we breathe, do not normally get into the deeper parts of the respiratory tract, but are kept back by the nose and naso-pharynx. It is evident that if these parts have the function of keeping back from the lungs pathogenic micro-organisms suspended in the air, they must necessarily be endowed with such properties as to make innocuous or remove such micro-organisms. Nature, in the phytogenetic development of the upper parts of the respiratory tract in higher animals, could not create an apparatus which should have the function to keep back inimical elements, without also investing it with the power to destroy or get rid in some way of these dangerous, unwelcome guests. Robert Koch,[9] indeed, stated, in one of his first publications concerning the etiology of tuberculosis, that the tubercle bacillus, if it has entered the respiratory tract, is usually removed by its ciliated epithelium. Cornet[10] points out that not only the ciliated epithelium, but also the current of mucus forms a potent physiological safeguard against the inroad of bacilli. The upper parts of the respiratory tract are endowed either with ciliated epithelium or with pavement epithelium in a thick layer; a few spots only of parts more or less in relation with the upper air-passages are devoid of any epithelium whatever, but here we have a strong constant double current of leucocytes—one current toward the interior, one directed outwardly. It is the function of the latter to destroy micro-organisms coming in contact with the parts so protected.[11] These are all, as we see, provisions to pevent foreign obnoxious elements from either entering the deeper parts of the respiratory apparatus, or getting into the substance of the structures forming the upper parts. That this is effectually accomplished, as far as the tubercle bacillus is concerned, is proven by the comparative rareness of tubercular affections of the pharyngeal[12] and nasal mucous membranes.

While, as stated above, tuberculosis of the nasal mucous membrane is

a subject which has only received recently the attention it deserves, this pathological lesion has been mentioned centuries ago, already by no less a medical genius than Morgagni,[13] who put a case on record from the post-mortem table, stating that it showed tubercular ulcerations of the upper parts of the pharynx, extending thence to the velum palati, and *from the latter to the nasal mucous membrane.* Bayle[14] must have seen tubercular ulcerations of the nose, because he says: "Qui occupent assez souvent la bouche, le pharynx *et même les fosses nasales des phthisiques* . . . je soupçonne que cette affection tient à la diathèse tuberculeuse."

The first more modern case of tuberculosis of the nasal mucous membrane was recorded by Willigk,[15] who, in his report of 1600 autopsies made at the Prague Pathological Institute from 1850 to 1852, comprising 476 individuals tuberculously infected, found one male with tuberculosis of the septum narium. Further details are not given in this case. The next case of which we read in literature is the more interesting, as it is one of tuberculosis of the upper air-passages (above the larynx) *without any affection of the lungs.* On November 16, 1875, W. Fairlie Clarke[16] exhibited before the meeting of the Pathological Society of London, Eng., a specimen of what he called tubercular lupus of the tongue, palate, and gums, taken from a male patient, eighteen years old, a bricklayer, who died at the West London Hospital, from inanition, the tubercular affection having finally prevented him from taking any food. It is further stated in the post-mortem report that the mucosa of the nose was thickened and ulcerated. The case was diagnosticated *intra vitam* as one of tuberculosis by Sir James Paget. Mention is made in the post-mortem report, that the lungs were entirely free from any pathological changes. The next cases are reported by Laveran,[17] in 1877, and during the next twelve years quite a number of additional reports of cases came forth, so that Mertens,[18] in 1889, in a dissertation made under the direction of Dr. Otto Seifert, Chief of the University Polyclinic for the Diseases of the Nose, Buccal Cavity, and Throat, at Wuerzburg, was able to give a collection of thirty-one cases, in which collection, however, two of the older cases were not included.

Including ten new unpublished cases, a history of which will be given presently in this paper, I am able to now tabulate from literature eighty cases of tuberculosis of the nasal mucous membrane. This number does not include a few more case-reports recently published in medical periodicals and annuals, which are at present not accessible to me, namely, cases published by Hajeck,[19] Maracêk,[20] and Heryng,[21] two cases of which absolutely no details are given, and of which Scheinmann[22] only states that they were greatly benefited by a course of pyoktanin treatment, nor, finally, nine cases by Capart,[23] who says that

he has seen twelve cases of nasal tuberculosis, but only gives details of three of them.

The new cases published in this paper came under observation since 1889 (after the publication of Mertens' paper), at the Wuerzburg Polyclinic, except the last one, which was seen by the author after his return from Germany, in his private practice at Cincinnati, Ohio. The following is an abstract of the history of these ten cases:

CASE I.—This case has been reported in literature before; it was one of Mertens' (*loc. cit.*) cases which again came under observation and treatment later on. It well illustrates the chronic course of tuberculosis of the nasal mucous membranes and its tendency to lead to frequent relapses of the pathological process in spite of energetic surgical interference.

E. S., female, born in 1868. States that she has been the subject of some eye trouble in the left eye (dacryocysto-blennorrhœa) for eight years. She now (1886) complains that the left side of her nose is stopped up, so that she cannot breathe through it. The examination of the nasal cavities shows an hypertrophic left lower turbinated covered with granulations which bleed easily. December 31st, the granulating hypertrophies were removed by the cold snare. On February 10, 1887, the operation wound, after several cauterizations with chromic acid, and after a prolonged course of iodol insufflation, had cicatrized. June, 1888, the patient presented herself again with suppurating cervical glands. They were removed and found to be tubercular. Nasal cavities apparently in normal condition. February 4, 1889, the patient again complained about the stopping up of the left side of the nose. The trouble began, as patient states, about eight weeks before. Examination showed that the left lower meatus was completely obstructed by a granulation tumor. This tumor was removed, and a very few tubercle bacilli were found in sections made from it. The patient, after some time, ceased to attend. (So far, the case has been reported already by Mertens.)

January 23, 1890. Patient again makes her appearance at the clinic; she again complains that the left side of her nose is stopped up. Other cervical glands are suppurating. The examination shows granulating masses springing from the left lower turbinate filling up the lower and the middle meatus. A posterior rhinoscopic examination shows thickening of the septum at the posterior nares on both sides. Tongue and mucous membrane of cheeks normal; teeth sound; larynx normal. The tubercular masses in the nose were removed, and the suppurating cervical glands extirpated. The patient soon again disappeared, before the open surfaces in the nose had healed up.

CASE II.—A. V., aged twenty-six years, female, servant-girl. This patient has been under treatment before for lupus faciei, and lupus mucosæ nasi. She now presents a lupus at the inner canthus of the right eye. On the left surface of the septum there is seen a small exostosis, opposite to which there is a small ulceration on the lower turbinated bone. The naso-pharynx is filled with dried-up crusts. Tongue coated, several teeth necrotic, larynx normal.

March 13, 1890. Cauterization of the ulceration with acidum trichloraceticum; aristol insufflation.

15*th*. Repeated cauterization with acid. trichloracet.; aristol insufflation.

20*th*. Cicatrization complete; patient dismissed from treatment.

June 30. Patient, who has been for eight days under treatment at the eye clinic, makes her appearance again. On the floor of the right nasal cavity a new ulcer has appeared, likewise on the middle of the right lower turbinated bone on the same spot where formerly an ulcer had been situated. The ulcerations were scraped with the sharp spoon, and the bleeding surface was treated with pure lactic acid.

July 10. Wounds healed up; patient dismissed from treatment.

November 7. Patient makes her appearance again. The right nasal cavity at its floor shows granulations, on the left side the lower turbinated bone

shows ulcerations. Old lupus of the ductus naso-lachrymalis on the right side, fresh lupus of this duct on the left side. The treatment consisted in the same measures adopted before; besides, on December 1, 1890, the patient received a tuberculin injection. Typical reaction of the lupoid ulcerations on the face, etc., and on the nasal mucous membrane where the ulcerations were situated. After the third injection of tuberculin all of the ulcerations were healed up, on December 13th; on December 20th there were again new ulcers showing themselves. After eight more tuberculin injections all was again healed up. February 17, 1891, no more reaction after tuberculin injection. February 24th, a small ulceration on the left lower turbinate bone again visible, which was treated with lactic acid. The patient did not make any further attendance.

CASE III.—H. E., aged twelve years, came to clinic again March 17, 1890; he had been previously treated (about one year before) for tuberculosis of the nasal mucous membrane, and an ulcer on the right lower turbinated bone. When the patient came under observation again, on above date, the lymphatic glands of the neck, especially those situated below the inferior maxilla, were all enlarged; lungs normal. The lower free margin of the inferior turbinated bone presented a small ulcer. Naso-pharynx smooth; in the middle of the pharyngeal tonsil a long cleft presented itself. Tongue smooth, papillæ normal; lingual tonsil slightly hypertrophic. Ulcer cauterized with acid. trichloracet.

27*th*. Repeated cauterization.

April 10. Ulcer healed.

25*th*. Patient dismissed.

July 1. Patient again came up for treatment. Ulcer on the floor of the right nasal cavity; on the septum cartilaginum and on the right lower turbinate, profuse granulations everywhere in ulcerations. Scraping with sharp spoon; cauterization with lactic acid.

10*th*. The ulcers have not yet healed; new granulations have appeared. Treatment as before.

25*th*. Ulcerations healed. Patient instructed to introduce into his right nasal cavity, daily, a tampon saturated with equal quantities of balsam of Peru and glycerin.

March 18, 1891. Patient, who has been feeling perfectly well until about two weeks ago, complains about the formation of crusts in his nose. An examination reveals ulcerations and granular masses at the places where they had been previously observed. Therapy as before.

April 12. New granulations removed.

June 3. New granulations removed.

October 1. Patient had not come to the clinic for a number of weeks. His mother got impatient, and took the boy away from town to the home of Rev. Pfarrer Kneipp, who examined him, pronounced his case one of nasal polypi, and ordered "Zinnkrautthee and Knieguesse." The patient now shows extensive ulcerations, and the septum is perforated. Therapy as before; europhen insufflation.

March 5, 1892. During the last week a shallow ulceration has appeared on the lower margin of the right nasal bone. The sound introduced into this ulceration can be felt from the outside through the external integument. Therapy: Opening of the nasal cavity during chloroform narcosis; scraping with sharp spoon.

18*th*. Incision wound healed; more granulations removed.

October 25. Several times small granular masses were removed since the last extensive operation. The general condition of the patient has improved materially. He looks well; the cervical glands are normal in size and consistency. The ulcerations in the right nasal cavity are healed; only a few granulations remain on the right lower turbinate. They were removed with the sharp spoon.

CASE IV.—May 5, 1891. A. N., aged twenty-six years; farmer's daughter. Has been treated for three years for tuberculosis of the nose. Patient of medium size, of strong build; submaxillary glands indurated; cicatrices of former glandular suppuration. On the left side of the septum, beginning

near the anterior nares and extending to a good distance posteriorly, an ulceration is seen, of an uneven surface, irregular outlines covered with thick granulations. These granular masses at the anterior margin of the ulcer form a small tumor. Another small tumor is seen on the inferior turbinate on the same side, which is of a dark-red color and bleeds easily. Larynx normal. Removal of the tumors by means of the cold snare and cauterization with acid. lactic. pur.

June 2.—Patient shows again an ulcerating surface on the septum. The ulcer cauterized with lactic acid.

6*th*. Ulcer on the septum almost completely healed. The lower turbinate is free from any ulceration.

CASE V.—K. Z., aged thirteen years, female. Patient thin, anæmic; tuberculosis of the ductus naso-lachrymalis on both sides; the ducts are laid open by ulcerations. Lungs do not give any signs of pathological changes. On the floor of the right nasal cavity, near the ostium nasale of the lachrymal duct, opposite the right middle turbinate, a tuberculous shallow ulceration. An ulceration of the same kind on the anterior end of the left lower turbinate. Naso-pharynx and buccal mucous membrane, normal; larynx normal. The ulcerations were cauterized several times with lactic acid. Patient soon disappeared.

CASE VI.—September 4, 1890. F. S., pianomaker, aged fifty years, male; had been under treatment before for nasal trouble. In fair general condition of health; dulness over right apex. Nasal mucous membrane on left side reddened but not thickened, dry; on the right side a tumor of the size of a hazel-nut, springing from the middle turbinate, appears. The tumor has a granular surface, is of a grayish-red color, of soft consistence, and bleeds easily. The tumor can also be seen to some extent by posterior rhinoscopy.

18*th*. The larger part of the tumor removed by the cold snare.

19*th*. The stump removed by the sharp spoon.

CASE VII.—October 9, 1890. R. Q., aged thirty-one years, male, a glass-worker. Large, stout, and healthy; lungs normal. On the left side of the septum, opposite the left inferior turbinate, an easily bleeding ulceration covered with tubercular granulations. They were removed with lactic acid. The patient soon disappeared.

CASE VIII.—S. P., aged forty-nine; farmer's wife. Has been suffering from a dacryocysto-blennorrhœa for two years, and from catarrh and stopped-up nose for one year; weakly built female. Ulcerating tubercles, ulcerations, and granulations are seen on the inner side of the right ala of the nose. The tip of the nose also shows tubercles.

May 5, 1892.—The granulations were removed by the sharp spoon. An iodoform tampon introduced.

23*d*. Repeated scraping with sharp spoon. Emplastrum hydrarg. applied to the tip of the nose.

June 1.—The wounds on the inner side of the ala have become cicatrized. A few new granulations around the perforation in the cartilaginous septum. Granulations are also now seen on the floor of the nasal cavity and on the lower turbinate. They were all removed by the sharp spoon.

28*th*. The nodules on the tip of the nose have disappeared; the skin over it is perfectly smooth. New granulations on the floor of the nasal cavity and on the lower turbinate. Removal by sharp spoon.

October 19. Tip of nose normal in appearance, also ala and anterior nares. Mucous membrane of interior shows smooth cicatricial tissue; perforation shows smooth margins.

CASE IX.—June 6, 1892. C. P., aged twenty-one years, male. No complaint about nose; healthy-looking; lungs normal. One sister died of pulmonary tuberculosis. No swelling of cervical or any other lymphatic glands. On the middle of the lower turbinate bone of left side a roundish tumor of the size of a hazel-nut, grayish-red in color, easily bleeding on being touched with a nasal sound. Larynx normal. Tumor removed. Patient did not return.

A few of these histories may, perhaps, appear to the critical reader somewhat short—too meagre to make on their showing a diagnosis of tuberculosis of the nasal mucous membrane. It may also elicit some doubt whether it is really correct that in a town of the size of Wuerzburg, within a few years, such a comparatively large number of cases of tuberculosis of the nose should have come under observation. It may be stated, however, that in Wuerzburg, as well as in the surrounding smaller places dependent for medical aid upon the hospitals and clinics of the former, tubercular affections are unusually common; this part of Germany seems to be completely impregnated with the tubercular virus. In fact, I have never been in any medical centre in the hospitals and clinics of which tubercular affections are so overwhelmingly prominent in number as in Wuerzburg. As far as the histories (copied from the clinic record-book) of some of the above cases are concerned, it must also be said that, after the first cases came under observation, tuberculosis of the nasal mucous membrane in Wuerzburg lost the dignity of a great rarity, consequently no very extensive entries were made in the clinic journals, though every case was examined carefully by Dr. Seifert and his assistants; particles of diseased tissue removed were examined microscopically, and when they did not give unmistakable evidence of the tubercular character of the process, the iodide of potassium treatment was tried, to establish or exclude the diagnosis of syphilis.

In one particular case, in which a number of circumstances combined to suggest the diagnosis of tuberculosis, the anti-luetic treatment compelled to a change of diagnosis. As this was a very instructive case its history may here be given:

M. S., female, aged twenty-one years, servant, had been suffering from a very obstinate conjunctivitis on both eyes. She was treated at the University Eye-clinic, and when she developed some nasal trouble she was turned over to the clinic of Dr. Seifert, with the diagnosis: *tubercular conjunctivitis*. A rhinoscopic examination revealed granular masses on both lower turbinates looking very much like tubercular nasal granulomes. Influenced by the external appearance of the neoplasms, the diagnosis of tuberculosis of the nasal mucous membrane was made, and the growths were removed. A microscopic examination, and later clinical observations, caused some doubt as to the correctness of the diagnosis of tuberculosis; an anti-luetic treatment was instituted, and under it the case was rapidly cleared up as one of syphilis of the nose.

Case X.—March 30, 1893, Cincinnati. C. G. B., aged thirty-three years, male, clerk; married for ten years; has no children; father died forty-three years old, of consumption; mother died of congestion of the bowels. About two years ago patient had a violent attack of coughing, with hemorrhage from lungs. Thinks, however, that he has not lost in weight during the last two years. No night-sweats, but coughs a good deal, especially in morning; denies infection, and no objective signs of it; uses alcohol and tobacco in moderate form. Has been hoarse for two months. Lungs: On left side below and above scapula behind, and below and above clavicle in front, dulness on percussion; bronchial breathing. Mucous membrane of pharynx injected and granular. Larynx mucous membrane injected; enlarged vessels; swollen; infiltration of false vocal cord on left side; true vocal cord on left side, margin ulcerated.

31*st*. Sputum examined; tubercle bacilli found in large number.

April 6 to 18. Patient has been ordered to take his temperature three times a day; it ranges between 99° and 101°. Temperature during the twelve days hardly ever normal.

3*d*. Patient, who had been ordered to take creasote, tr. gent. āā beginning with gtt. v and increasing by one drop every day up to gtt. xxx, stated that he had had since yesterday several copious hemorrhages from the nose. Examination revealed an oval, shallow, bleeding ulceration on the right side of septum near the floor, beginning almost directly behind the tip of the nose and extending backward, about 1 cm. long and 5 mm. wide Near the posterior pole of the oval ulceration the anterior end of a crista is covered with small grayish tubercles and granules. They bleed easily on being touched with the nasal sound. The surface of the ulceration and the tubercles on the anterior end of the crista are treated energetically with the galvanocautery burner; europhen is then insufflated, and the nasal cavity tamponed. During the next eight days the ulcerations bleed freely several times. They were not cauterized again, but sprayed freely with a solution of peroxide of hydrogen, and europhen then insufflated. This always acted as an astringent, and evidently also antiseptically, for gradually, as the patient (who can stand large doses of creasote remarkably well) under the general treatment improved in general health, the ulceration healed up.

May 15. The patient has gained six pounds in weight. The ulcers of the left vocal cord have improved under a 20 per cent. menthol (in ol. olivæ) and iodolum insufflation treatment, though not yet healed up. But the ulceration in the nose has completely healed up; its site is always covered with some crusts; on their removal the mucous membrane appears somewhat paler than that of the surrounding parts, but otherwise almost normal.

Undoubtedly the nasal ulceration and the granular nodules observed in this case were of a tubercular nature; they were characteristic in appearance, and occurred in a patient in the advanced stages of tubercular and laryngeal phthisis. The good result as to the treatment of these lesions in the nose (even if it be only a temporary one) I am inclined to attribute to the combination of the external surgical interference combined with the internal use of creasote, which evidently has acted very well, the patient having gained six pounds in weight under its use in about six weeks.

These, then, are the ten cases now first reported. I will now proceed to give a list of all cases published, and try to obtain from it a general clinical picture of the affection under discussion.

If we look over our collection of cases—eighty in number—we will find that tuberculosis of the nasal mucous membrane presents itself (a classification first proposed by Seifert) in three different forms: as an ulceration, as a tumor, and as a combination of both—either an ulceration, the margins of which present granular masses, or as a tumor which has been eaten away more or less by a process of ulceration. In our table we find seven cases in which no details are given as to the form of the tubercular lesion; the remaining seventy-three may be classified as follows:

Thirty-six cases in which the ulceration was predominant.

Twenty-nine cases in which the lesion had the character of a tumor.

Eight cases in which the lesion had a mixed character.

Statistical Table of Eighty Cases of Tuberculosis of the Nasal Mucous Membrane reported in Medical Literature.

No.	Reported by whom, and where	Sex.	Age.	Form of lesion, location, etc.	Primary or secondary, and remarks.
1	Morgagni: De sedibus et causis morborum.	...	...	Tubercular ulcerations of pharynx, velum palati and nasal mucous membrane.	
2	Willigk: Prager Vierteljahrschrift, xxxviii. p. 4.	...	...	Tuberculosis of septum.	
3	Clarke: Trans. Path. Soc. Lond., 1876, vol. xxvii p 248.	M.	18	Mucous membrane of nose ulcerated and thickened.	Secondary to tuberculosis of tongue, palate, gums; lungs free. Patient died of inanition.
4	Laveran: Union Médicale 1877, Nos. 35 and 36.	M.	25	Ulceration on septum.	Tuberculosis of lungs. Patient died of pyo-pneumothorax
5	Laveran: Ibid.	M.	43	Ulceration on septum.	Tuberculosis of lung. Patient died of phthisis.
6	Riedel; Deutsche Zeitschrift für Chirurgie, Band x. p. 57.	M.	63	Ulceration and perforation of cartilaginous septum; tumor in same 2½ cm. long; ulceration on left ala.	Primary; no evidence of pulmonary tuberculosis; reappearance of tumor and ulceration growths after surgical treatment.
7	Riedel: Ibid.	F.	55	Ulceration and perforation on cartilaginous septum, also tumor 1½ cm. long.	Primary; no evidence of tuberculosis of lungs.
8	Spillmann: Bernièr's Thèse de Spillmann, p. 190.	F.	33	Ulceration on left side of septum.	Phthisis, hæmoptysis, ulceration on anus.
9	Thornwald: Deutsche Archiv für klin. Mediz. Bd. xxvii. p. 586.	M.	26	Tumor on anterior end of left lower turbinate size of pea; on the floor of nasal cavity of same side tumors of same size; ulceration on septum.	Tuberculosis of pharynx, larynx and lungs
10	Wichselbaum: Allgem. Wiener med. Zeitung.	M.	15	Small nodules and tumors of size of hempseed on septum and floor of nasal cavities.	No further details given.
11	Wichselbaum: Ibid.	F.	62	Small tumors on right lower turbinate and on left middle turbinate.	No further details given.
12	Riehl: Wiener mediz. Woch., 1881, No. 45.	M.	36	Ulcer on left ala and on left side of septum.	Tuberculosis of lungs; died of phthisis.
13	Millard: Bull. Soc. Méd. des Hôp., 1881.	...	...	Tubercular nodules in nasal cavities.	Tuberculosis of pharynx. Post-mortem report no further details given.
14	Demme: Berl. klin. Woch., 1883, p. 218.	M.	1	Ulcer and small nodules on septum.	Tuberculosis of lungs; child died (1½ y'rs old) of phthisis.
15	Demme: Ibid.	M.	8 mos.	Nodules and ulcer in nasal cavities.	Primary when first seen. The child died soon after it came under observation of an acute attack of tubercular meningitis Post-mortem showed lungs and bronchial glands free from tuberculosis.
16	Berthold: Berl. klin. Woch., 1884, p. 644.	...	...	Tuberculosis of nasal mucous membrane.	No further details given.
17	Sokolowiski: Beitr. Chirurgie v. Bruns. Band iii. fasc. 3, p. 438.	F.	20	Ulcer on septum and floor of nasal cavity; tumor on anterior margin of ulceration.	Tuberculosis of lungs and larynx; death in consequence of these.
18	Schaefer: Deutsche med. Woch., 1887, No. 16.	F.	51	Granular tumor of septum cartilagineum	Primary; removal of tumor, reappearance later; perforation of septum.
19	Schaefer: Ibid.	F.	26	Granular tumor of septum cartilagineum.	Primary; removal, reappearance.
20	Schaefer: Ibid.	F.	39	Granular tumor of septum cartilagineum.	Primary; removal, reappearance, ulceration, perforation.
21	Schaefer: Ibid.	M.	32	Granular tumor of septum cartilagineum.	Primary; several times reappearance after removal.
22	Schaefer: Ibid.	M.	57	Granular tumor of septum cartilagineum.	Primary; tumor appeared after a kick (by a horse) in nose; after removal, no reappearance after nine months.
23	Schaefer: Ibid.	M.	51	Granular tumor of septum cartilagineum.	Primary; removal, reappearance
24	Cartaz: De la Tubercul. Nasale, Paris, 1887.	M.	42	Ulcer on septum cartilagineum.	Tuberculosis of lungs; died of phthisis.

No.	Reported by whom, and where.	Sex.	Age.	Form of lesion, location, etc.	Primary or secondary, and remarks.
25	Bruns: Reported by Zuneshaburo Kikuzi in Bruns' Beitr. z. Chir., Bd. iii. fasc. 3, p. 433.	M.	30	Tumor of septnm ulcerated on its surface.	Primary; no tuberculosis in other organs; removal, reappearance after five months.
26	Michelsohn: Zeitschr. f. klin. Mediz., 1890, Bd. xvii.	F.	27	Tumor of septum cartilagineum.	Primary; no tuberculosis in other organs. Patient a demented, neglected girl. Removal, reappearance, later ulcerations.
27	Michelsohn: Ibid.	F.	21	Ulceration of septum cartilagineum.	Tuberculosis of larynx and lungs; died of phthisis
28	Michelsohn: Ibid.	F.	48	Tumor of septum cartilagineum.	Primary; no tuberculosis of other organs.
29	Michelsohn: Ibid.	F.	19	Tumor on left lower turbinate.	Tuberculosis of larynx and lungs.
30	Michelsohn: Ibid.	M.	18	Ulcer on septum cartilagineum and ala.	Tuberculosis of upper lip, of submental and submaxillary glands; lungs free.
31	Juffinger: Wien. klin. Woch., 1889, ii. 253.	F.	21	Tumor of septum.	Lupus of cheek and neck; removal, reappearance.
32	Hajeck: Inter klin. Rundschau., 1889, iii. 613.	M.	30	Ulcer on septum.	Tumor in naso-pharynx; tuberculosis of lungs; removal; ulcerations.
33	Hajeck: Ibid.	M.	13	Ulcer; destruction of septum osseum.	Tuberculosis of glands.
34	Hajeck: Ibid.	F.	24	Ulcer on septum cartilagineum et osseum.	Patient otherwise healthy.
35	Mertens: Dissertatio Inauguralis. Wuerzburg, 1889.	F.	53	Ulceration on right lower turbinate and on left side of septum cartilagineum.	Primary; no tuberculosis of other organs; cauterization of ulcers; frequent new ulcerations appear on site of old ones.
36	Beermann: Dissertatio Inauguralis. Wuerzburg, 1890.	F.	34	Small tuberculous tumors on right side of septum cartilagineum.	Primary; no tuberculosis of other organs; removal, reappearance after 3 months.
37	Hahn: Deut. medizin. Woch., 1890, N. 13, p 497.	F.	22	Several small tumors on septum cartilagineum and right lower turbinate.	Primary; no tuberculosis of other organs; removal; after six months tumor had not reappeared.
38	Hahn: Ibid.	M.	40	Tumor size of walnut which had perforated septum and protruded into other side.	Lupus of hand and face had been existing for many years.
39	Hahn: Ibid.	F.	55	Tumor size of hazelnut; perforated septum cartilagineum.	Primary; no tuberculosis of other organs; removal; tumor had not reappeared after three months.
40	Hahn: Ibid.	F.	17	Two small tumors on septum cartilagineum.	Chronic eczema of face; no tuberculosis of other organs.
41	Hahn: Ibid.	F.	19	Ulcer with granular masses on right side of septum cartilagneum.	Blepharitis ulcerosa; keratitis superficialis; scrofulus habitus; eczema of upper lip.
42	Hahn: Ibid.	F.	17	Ulcer with granular masses on septum.	Left apex dulness on percussion.
43	Knapp: Arch. f. Ophth., 1890, vol. xix.	M.	19	Ulcer in nose several years before; a tubercular conjunctivitis came under observation	No tuberculosis of other organs mentioned.
44	Fitzpatrick: Cin. Lancet-Clinic, 1891, p. 468.	M.	25	Tubercular ulcer on mucous membrane.	Tuberculosis of pharynx and lungs; died of phthisis.
45	Fick, Correspond.-blatt. f. Schweiz. Aerzte, 1891, p. 211.	F.	26	Tuberculosis of left side of septum.	Tuberculosis of nasal duct both apices suspicious.
46	Haab: Ibid.	M.	...	Tuberculosis of nasal mucous membrane.	Tuberculosis of conjunctiva
47	Gottstein: Die Krankheiten de Kehlkopfes, 1890, p. 272	...	...	Tubercular deposit on septum narium, and perforation.	Tuberculosis of lungs, otitis media phthisica.
48	Grunwald: Die Lehre von den Nasen Eiterungen. Munich, 1892, p. 48.	...	...	Tuberculosis of nasal mucous membrane left lower turbinate.	Empyema of the antrum of Highmore.
49	Grunwald: Ibid.	...	...	Tuberculosis of nasal mucous membrane, right lower turbinate ulcerated.	Empyema of the antrum of Highmore.
50	McBride: Diseases of the Throat, etc. Philadelphia, 1892.	...	...	Tubercular nasal ulceration of lower and anterior part of septum; margins thickened.	No further details given.

No.	Reported by whom, and where.	Sex.	Age.	Form of lesion, location, etc.	Primary or secondary, and remarks.
51	Jurasz: Die Krankheiten der obern Luftwege. Heidelberg, 1891, p. 2. (The first of Jurasz's three cases has also been previously reported by Boylan, Cincinnati Lancet-Clinic, 1888, vol. xiv. p. 1.)	F.	19	Flat tumor on right side septum cartilagineum, uneven and ulcerated on surface.	Tuberculosis of skin of left thumb and right cheek was the primary tubercular affection; lungs at time when patient was seen first normal. One year later patient died of galloping phthisis.
52	Jurasz: Ibid.	M.	36	Irregular, ragged-edged ulcer on left side of septum.	Tuberculosis of lungs, caries of ribs, tuberculosis of buccal mucous membrane
53	Jurasz: Ibid.	M.	44	Ulcer in a thickened mucous membrane on right side of septum.	Phthisis pulmonalis et laryngis, also tubercular ulcer on tongue.
54	Olympites: Thèse de Paris, 1890.	M.	36	Ulcer on septum cartilagineum covered with small granulations.	Pulmonary and laryngeal tuberculosis.
55	Luc: Arch de Laryngol 1889, Tome iii. p. 19.	M.	...	Granular tumor of the right lower turbinate ulcerated on its surface, later ulceration on left middle turbinate.	Tuberculosis of pharynx; tubercular orchitis; lungs very slightly suspicious.
56	Moure: Thèse de Paris de Boutard, 1889.	..	...	Tubercular ulceration in nose.	Tuberculosis of lungs, larynx, and pharynx.
57	Moure: Ibid.	M.	29	Ulcer on right side of septum cartilagineum, with granular surface.	Tuberculosis of lungs and larynx.
58	Ruault: Ibid.	M.	35	Oval ulcer on right side of septum cartilagineum near entrance to nose.	In last stages of tuberculosis of lungs.
59	Ruault: Ibid.	F.	40	Tumor springing from right side of septum cartilagineum.	Tubercular infiltration of larynx; fifteen months later tubercular infiltration of left apex. After removal of tumor septum soon became perforated. Death three months after pulmonary infiltration was first noticed.
60	Ruault: Ibid.	E.	23	Tumor on left side of septum cartilagineum	Primary; examination of lungs negative. This case was under observation two years; tumor removed four times; came back three times Five months after last removal no reappearance. Patient's condition of general health very good
61	Capart: Bull. de l'Acad. Roy. de Med. de Belg., 1890, Tome vi. p. 785.	F.	25	Easily bleeding soft tumor on the right side of septum cartilagineum.	Lungs free. The tumor was first, in 1884, believed to be a sarcoma. It was, therefore, extirpated very carefully, and did not reappear. Later the author corrected his diagnosis to tuberculosis of nasal mucous membrane.
62	Capart: Ibid.	F.	53	Easily bleeding soft tumor on the right side of septum cartilagineum.	Probably of secondary nature. Patient died soon of miliary tuberculosis
63	Capart: Ibid.	M.	35	Large tumor on septum cartilagineum.	No details as to primary or secondary nature given. Author states, after citing Cases 62 and 63, that he has seen in all 12 cases of tuberculosis of nasal mucous membrane; patients aged between 21 and 55 years; 7 males and 5 females.
64	Grossard: Anales de la Polyclinique Paris-Bordeaux.	M.	...	Tubercular ulcer on septum cartilagineum.	Tubercular bronchitis; patient was also syphilitic.
65	Vincenzo Cozollino: Gaz. Medic. di Roma, Anno 1889, xv. p. 145.	F.	young girl	Tubercular ulcer on septum cartilagineum, with perforation.	Tuberculosis of lungs; died of phthisis
66	Cozollino: Ibid.	M.	...	Tubercular ulcer on septum cartilagineum, with perforation.	No further details.
67	Baber: Brit. Med. Journ. 1889, No. 22, vol. vi. p. 1407.	F.	18	Perforation of septum cartilagineum.	Strumous disease of upper air-passages, tubercular eruption on outside of nose.

No.	Reported by whom, and where.	Sex.	Age.	Form of lesion, location, etc.	Primary or secondary, and remarks.
68	Tenneson: Anales de Dermatologie et Syph., 1889, vol. iii. p. 214.	...	...	Tubercular ulceration in nasal cavities.	Consolidation of right apex.
69	Onodi: Pest. med.-Chir. Presse, 1891, No. 46.	...	...	Tuberculosis of nasal mucous membrane.	
70	Browne: Sajous' Annual 1888, vol. iii. p. 261.	F.	20	Tuberculosis of nasal mucous membrane.	Tuberculosis of pharynx and larynx.
71	Own Case, No. I. (This case was once before reported by Mertens: Dissert. Inaug. Wuerzburg, 1889. It came again under observation later on, and was therefore left out of the table above.)	F.	24	Nasal tuberculosis first complained of in 1886; granular masses on left lower turbinate; later large granular tumor.	Eye trouble (dacryocysto-blenorrhœa since 1878) suppurating cervical glands.
72	Case II.	F.	26	Ulceration on floor of nose, right side, and on left lower turbinate.	Lupus of face and also formerly lupus of mucous membrane of nose; lupus of inner canthus of right eye.
73	Case III.	M.	12	Ulceration on right lower turbinate floor and septum cartilagineum; later perforation.	Enlargement of cervical glands; lungs free. After long treatment finally good result. General health good.
74	Case IV.	F.	26	Ulceration of septum cartilagineum, covered with thick granulations, also tumor.	Strumous habitus; vestiges of glandular suppuration.
75	Case V.	F.	13	Ulcerations on floor and on left turbinate bone.	Lupus of ductus naso-lachrymalis on both sides; lungs free.
76	Case VI.	M.	50	Granular tumor of size of hazelnut springing from right middle turbinate.	Dulness over right apex.
77	Case VII.	M.	31	Ulceration on left side of septum cartilagineum, with granular masses.	Lungs normal.
78	Case VIII.	F.	49	Ulcerations and granulations on right ala; later perforation of septum.	Dacryocysto-blenorrhœa for two years; tip of nose shows granulations.
79	Case IX.	M.	21	On middle of lower turbinate a granular easily bleeding tumor.	Lungs and larynx normal; everything else normal.
80	Case X.	M.	33	Tubercular ulcer right side of septum cartilagineum, with small tubercles.	Tuberculosis of lungs and larynx; hæmoptysis.

Of course, one must not suppose that this classification is an absolute one. Very frequently we find an ulceration with some small granular masses either on its margins or its surfaces; if the ulceration is so pronounced that compared with it the neoplastic formation is insignificant, we have classified such a case as one of the ulcerative variety. On the other hand, we rarely see a tumor which is absolutely intact and without any ulceration whatsoever. However, if we see a case in its earliest stages we may find a perfectly intact tumor. Such was the case in my own patient No. IX. This case was only discovered accidentally; there were no complaints on the part of the patient, who was, to all intents and purposes, a healthy young laborer, in whom, outside of this tumor, no pathological condition could be discovered. The tumor was removed, and a microscopic examination verified the diagnosis made previously from the clinical aspect of the case. If we study closely our cases tabulated, we are perhaps able to gain some points as to the question

why tuberculosis of the nasal mucous membrane presents itself in one case in the form of a tumor, and in another in the form of an ulceration. In all probability we find a tumor in cases where we have to deal with the immigration of a comparatively small number of tubercle bacilli only, while in those cases where a large number of bacilli assault the tissues from the start, we will find the ulceration. The toxic effects of a large number of bacilli, which, of course, produce larger quantities of ptomaines, is so powerful that the formation of a neoplasm of any size is impossible. I use the term neoplasm unhesitatingly for tubercular nasal tumors. The fact that they may disintegrate later on in their existence is certainly not opposed to our views, because neoplasms of other kind take the same course. It is almost impossible to understand how a laryngologist of merit and distinction can deny the existence of tubercular tumors in the nose, and maintain that if such tumors are found they are originally not of a tubercular nature, but are only secondarily so infected. Bresgen,[24] who claims this, stands, as far as I can see, alone in his views, which are the less justifiable, first from the fact that in tubercular tumors we do not find the bacilli on or near the surface (Hajeck, *loc. cit.*); secondly, from the fact that we have in other situations and organs of the body tubercular processes leading to the formation of large and granular masses. We find in the larynx, as everybody knows, frequently extensive infiltrations, which only later on disintegrate and ulcerate. I have myself on one occasion seen such a powerful, rapidly growing neoplastic formation in one of the false vocal cords of a young woman aged about thirty years, that one of the greatest authorities in laryngology made the diagnosis "sarcoma of the larynx," which diagnosis, later on, had to be corrected to "tuberculosis," bacilli and giant cells having been found in an extirpated piece of the tumor.

Our view that the number of bacilli will influence the form of the tubercular lesion in the nose, is borne out by the fact that where we have to deal with a tuberculosis of the nasal mucous membrane secondary to phthisis—that is, under conditions when the individual permanently produces and expectorates enormous numbers of bacilli, and is exposed to them, where, consequently, when it comes to an invasion into the nose, most probably large numbers of bacilli locate there from the start—there we find almost universally, as seen from our table, the ulcerative form. On the other hand, where we have to deal with a primary tuberculosis of the nose, we almost exclusively find the lesion in the form of the tumor. This brings us to the question of *primary tuberculosis of the nasal mucous membrane.* That such a thing is possible has been denied; however, this denial is not borne out by the facts. Our table probably contains twenty cases of primary nasal tuberculosis.

Even if we admit that in some of these twenty cases doubts may arise as to their primary nature, we have cases enough left to prove that

such a thing as primary nasal tuberculosis does occur. The case given in our table under No. 3, while it is probably not a case of primary tuberculosis of the nasal mucous membrane, but one of primary tuberculosis of the pharynx or tongue, is a clear post-mortem report, showing that tuberculosis of the upper air-passages without phthisis does occur. If we read the histories of some of Schaeffer's (*loc. cit.*) cases (Table, Nos. 19–24) we shall find that it would be almost impossible to make of them anything else but primary cases.

An especially interesting and instructive case is Demme's second case (Table, No. 15). The little patient, a boy eight months old, from healthy stock, was given out when six months old to board with a family, the head of which was the subject of an advanced pulmonary tuberculosis. After being in charge of this man for two months, the child was brought to Demme for treatment, suffering from a nasal affection presenting the general features of an ozæna. There was no trace of a history of tuberculosis or syphilis in the parents of the child. A close rhinoscopic examination revealed grayish tubercles and ulcerations in the nose of the infant. The secretion taken from these lesions contained tubercle bacilli. A few days after coming under observation the boy became the subject of a very violent meningitis, rapidly leading to a fatal issue. The post-mortem revealed a tubercular basilar meningitis; while the lungs, bronchial glands, and abdominal organs, were absolutely free.

This case certainly must be looked upon as one in which the nasal tuberculosis was the primary affection. From the nose, the habitat of the tubercle bacilli, the latter found their way into the meninges, a convenient road over which not so unfrequently, even after insignificant operations in the nose, another micro-organism, the diplococcus of Fraenkel, travels to produce another meningeal affection, cerebro-spinal meningitis. Another case, which can hardly be construed as anything else but a primary one, is one of Ruault's cases (Table, No. 60). The patient, a healthy young woman of twenty-three years, was under observation two years; she never showed any signs or symptoms of anything else but her nasal trouble, which finally, after a fourth removal of the tumor, did not reappear. The patient's general condition while under observation was always good.

One of Michelsohn's cases (Table, No. 26), that of a demented, very much neglected girl of twenty-seven years, who was under observation for a long time, is also an undoubted primary case. We can well imagine how in it the infection was brought about. Demented individuals are very unclean; they do not pay any attention either to hygiene, cleanliness, or æsthetics. So this girl was probably in the habit of boring frequently with dirty fingers in her nose, and finally succeeded in importing bacilli into its mucous membrane. Probably, in the same manner, the nasal tuberculosis was brought about in one of Jurasz's cases (Table, No. 51).

The patient was suffering from a tubercular ulceration of the integument of the left thumb; this latter case, of course, is to be considered one of secondary nasal tuberculosis.

Some of our own cases might be enumerated here, but it is hardly necessary to dwell any more upon the subject; the possibility and occurrence of primary nasal tuberculosis cannot be doubted.

The *secondary* form of nasal tuberculosis is usually due to phthisis, be it that the bacilli which the phthisical patients expectorate are inhaled into the nose, or be it that they are carried to the nose through the blood and lymph channels. The latter seems to me very improbable.

In our table we find twenty-five cases in which tuberculosis of the lungs and larynx is mentioned as the primary affection. Ten times we find tuberculosis of the pharynx, palate, and tongue mentioned in connection with nasal tuberculosis; the latter form is usually secondary to the former. The *seat* of the tuberculosis of the nose is of interest. Often we find that more than one of the structures of the nasal cavities are involved. Fifty-three times we find the septum mentioned as the seat of the lesion; almost universally it is the septum cartilagineum which is involved; this part is either expressly mentioned, or the seat of the lesion, with reference to the entrance of the nose, is so described that one can easily see that the seat must be in the cartilaginous part of the septum. Only twice we find the septum osseum the site of the tubercular lesion: two of Hajeck's cases (Table, Nos. 33 and 34). Not infrequently the tubercular lesion situated on the septum leads to perforation, but as the osseous part is so rarely involved, saddle-noses in consequence of nasal tuberculosis almost never occur. Other parts of the nasal mucous membrane affected are: the lower turbinate (eleven times), the middle turbinate (three times), the inner side of the alæ (four times), the floor of the nose (five times). No details as to the seat of the lesion are given in ten cases. From the above figures we see that the septum cartilagineum is by far the most favored site of tubercular lesions of the nasal mucous membrane; it evidently constitutes in the nose a locus minoris resistentiæ for Koch's bacillus. As to sex, nasal tuberculosis in contradistinction to laryngeal tuberculosis does not seem to have any preference. Our table shows—

	Cases.
Males	35
Females	34
Sex not stated	11
Total	80

If we divide our material according to age we get the following figures:

	Cases.
1 year or under	1
1 year to 10 years	1
11 years to 20 years	16
21 " 30 "	19
31 " 40 "	13
41 " 50 "	6
51 " 60 "	7
61 " 70 "	2
Age not given	15
Total	80

The youngest patient, as shown by our tables, was eight months, the oldest sixty-three years old. The majority of all eighty cases occur between the ages of eleven and forty (forty-eight times). Nasal tuberculosis under one year and beyond sixty years, is very rare.

Tubercular tumors of the nasal mucous membrane are very variable in size; we find them from a millet-seed size to a large walnut size. The largest tumor in size is put upon record by Hahn (Table, No. 38); it occurred in a laborer, forty years old, who first came to the clinic in 1886. The patient presented a lupus of the hand, stating that he had had this affection since his twelfth year, a lupus of the tip of the nose since his seventeenth year, a chronic nasal catarrh since his nineteenth year. In the left inferior meatus there was seen an easily bleeding granular tumor of the size of a large walnut. The tumor had perforated the septum, and protruded into the right nasal cavity. After its removal the microscopic examination of sections of the growth revealed the characteristic structure of nasal tuberculomes, including the presence of tubercle bacilli. This case is not only of interest because it presents the largest tumor on record, but also because it shows the close relation between tuberculosis of the nasal mucous membrane and lupus of the external integument, a subject to be mentioned more fully below.

Tubercular nasal tumors are of roundish or elliptical general outlines; their surface is rarely perfectly smooth; as a rule it is uneven; granular, covered with tubercles; presenting, on the whole, somewhat of a strawberry appearance as to outline, but not as to color, because a grayish or grayish-yellow tint is predominant over the red or pink of the healthy normal nasal mucous membrane. The consistence of these granulation tumors is rather soft; they bleed very easily on being touched with the sound.

Sometimes we find instead of one well-defined tumor a number of small tubercular nodules. These generally disintegrate very soon, and when they are seen, not unfrequently after a short time the picture presented is that of an ulceration, nothing having been left of the neoplastic formation. The ulcerations found in nasal tuberculosis are generally

shallow, but sometimes also deeper ulcerations are seen; they are roundish, elliptical, or perfectly irregular in outline, surrounded by elevated soft margins, showing miliary tubercles. These ulcerations always bleed more or less; sometimes they may give rise to quite profuse hemorrhage. In our own case (No. X.) this occurred; the bleeding was quite free, a larger bloodvessel probably having been laid open by the ulcerative process. Sometimes large granular masses, more or less soft, and easily bleeding on being touched by the sound, spring from one or more points of the circumference of the margins of the ulcer.

The *microscopical examination* of tumors and granular masses removed from the margins of an ulceration, show a granular tissue traversed by connective-tissue bands. The cellular elements very much predominate, and consist of lymphoid and epithelioid cells. Frequently we see an aggregation of the cellular elements in masses, which present themselves in section in circular or oval outlines. Sometimes these cellular aggregations show nothing but a dense mass of cells, but sometimes the character of the genuine tubercle becomes evident, and giant cells, show themselves. Tubercle bacilli, if found, are few and far between. One often has to examine several sections of one and the same specimen before being able to detect tubercle bacilli. According to Hajeck (*loc. cit.*), they are easier found and in greater number in the deepest layers of the tumors. Bloodvessels are not so numerous in tubercular neoplasms of the nose, as, for instance, in sarcomatous growths. But they are more numerous than in syphilitic neoplasms. Around a bloodvessel, in a nasal tuberculome, we often find an aggregation of the cellular elements; sometimes cells have proliferated through the vessel wall into the lumen of the vessel; but we never see, as in syphilis, an extensive cellular proliferation comprising the whole circumference, and thickening enormously the middle coat of the vessel.

The *symptoms* of our disease vary a good deal according to the form under which it presents itself. Not infrequently, in the earlier stages, we do not find any symptoms at all. The patients have perhaps had a little running from the nose, sometimes a few drops of blood mixed with the discharge, but have not been inconvenienced to any extent, and have not paid any special attention to their trouble. Sometimes we have to deal with a tumor which has not yet attained a large size, and has absolutely not given rise to any symptoms whatever (our case No. IX.).

At other times, however, the tumor has become of such a size that the patient comes with the statement that his nose is stopped up. If we have to deal with the ulcerative variety the complaints will be profuse discharge, mixed with blood of a general muco-purulent character, yellowish or greenish in color, and often fetid. The formation of crusts is generally complained of by patients the subject of tuberculosis of the nose. Pain is rarely a symptom, and externally the nose seldom presents any

anomalies, lest it be that we either have a complication with lupus or tuberculosis of the external nasal integument, or that we meet with one of these very rare cases, when the tubercular process has destroyed the septum osseum, and consequently has given rise to a "saddle-nose." If after taking notice of the subjective symptoms a case presents, we next proceed to an objective examination, we will get a different picture, according to the variety we have to deal with, but, as a rule, in each case we find the attacked side of the nose filled with greenish-yellowish crusts; not infrequently a certain amount of fetor emanates from the nasal cavities. After the crusts are removed we will be able to see whether we have to deal with a case of tumor of the nose, ulceration, or one of a mixed character. In making a *differential diagnosis* of tuberculosis of the nasal mucous membrane, all the points as to clinical features, appearance of the lesion, etc., brought out above, have to be considered. It is sometimes not at all easy to make a correct diagnosis of each case when first seen. But the combination with tuberculosis of other organs, which is the rule (primary and uncomplicated cases being greatly in the minority), will greatly help toward a correct diagnosis. A microscopic examination will generally make a diagnosis absolutely certain. With carcinomatous growth, tubercular neoplasms of the nose could hardly ever be confounded; sarcomatous tumors of the small-celled variety may possibly mislead, but they are richer in bloodvessels than tuberculomes, and, of course, do not show any giant cells or bacilli. Clinically, a case of a sarcomatous tumor of the nose will likewise soon distinguish itself from tuberculosis. These tumors grow rapidly, are very soft, smooth on their surface, vividly red to purple, even to almost black, in color. After partial extirpation, sarcomatous tumors do not, like tuberculomes, re-form comparatively slowly, but, on the contrary, with surprising rapidity. Carcinoma in the nose may be mistaken for tuberculosis, and *vice versa*, but the former disintegrates more rapidly, and the disintegration involves deeply the structures on which the cancer grows; the margins of the ulceration are not like those in tuberculosis, soft, but on the contrary, very hard. Besides, carcinoma leads soon to that characteristic hard infiltration of the neighboring lymphatic glands, while tuberculosis eventually leads to, or is secondary to, suppuration of the cervical lymphatic glands. Malignant cachexia also shows itself early in carcinoma, while tuberculosis of the nose, if not combined with tuberculosis of some vital internal organs, may last for years without very seriously involving the patient's general health. The most important differential diagnosis is that from syphilis of the nose, a very frequent affection which often can only be differentiated from tuberculosis with difficulty. Some of the best writers on tuberculosis of the nasal mucous membrane have made it a very important point of differential diagnosis that tuberculosis attacks the septum cartilagineum, while syphilis attacks the septum osseum, and avoids the former.

This point is brought out on the strength of a statement coming from a celebrated rhinologist, Voltolini,[25] who maintains that syphilis assaults the septum osseum eagerly, but shows as decided a dislike for the cartilaginous part of the septum. I cannot verify this statement of Voltolini by my own observations; they, on the contrary, indicate a quite different state of affairs. Others have also had experiences quite different from those of Voltolini, for instance Jurasz,[26] who reports fifty-five cases of syphilis of the nose in which forty-five times the septum was the seat of the luetic lesion. In thirty-one out of these forty-five cases a perforation developed in the course of the affection; thirty times this perforation was found in the septum cartilagineum, and only once in the septum osseum. I think that such statistics, coming from a perfectly reliable source, show that the seat of the lesion or perforation cannot be utilized as a point of differential diagnosis between syphilis and tuberculosis of the nose. We should always, whenever we suspect a case of nasal tuberculosis, try to exclude syphilis. Usually, this will not be difficult, because we generally will find other undoubted syphilitic lesions, or vestiges of such. In very small children suspected cases are almost always due to congenital lues, because nasal tuberculosis, as we have seen, under one year is of the utmost rarity, there being in all literature only one case on record, while early nasal syphilitic manifestations are by no means rare.

Michelsohn[27] believes that a valuable point of differential diagnosis is to be found in the observation that tubercular ulcers of the nose are of a roundish or irregular form, while luetic ulcerations extend in the form of a longitudinal furrow far backward. A microscopical examination may, in case we find giant cells or tubercle bacilli, make a diagnosis absolute, but the absence of them does not necessarily mean syphilis. Some other microscopical differences between tubercular and syphilitic tumors have been alluded to above. After all, we will meet cases where the diagnosis between tuberculosis and lues must be left in suspense—until we have come to a final conclusion, through the free administration of the iodides, which will definitely decide the case, *ex juvantibus et nocentibus.*

In some cases we shall not be able to distinguish tuberculosis of the nasal mucous membrane from lupus of the same structure. In the light of our present knowledge upon the etiology of tuberculosis and lupus, we cannot be astonished that such may be the case. We know now, beyond a doubt, that tuberculosis and lupus are due to the same etiological factor, and we must expect transitory forms, which will be called by one name by one observer and by another by some other writer. A good deal has been written upon a microscopic differential diagnosis between lupus and tuberculosis. I do not intend to go into any details upon this subject, as I believe a differential diagnosis between lupus or tuberculosis of the nasal mucous membrane can only be made by the

clinical aspect of the case, and not by a microscopical examination; this view seems to me the more correct, as among our eighty cases tabulated we find some in which, beyond doubt, a lupus of the face has spread to the nasal mucous membrane by continuity, and has there taken on the clinical characters and the form of a typical case of tuberculosis. A case of this kind is reported, for instance, by Hahn (*loc. cit.*, Table, No. 38). The patient, when seventeen years old, was the subject of a lupus of the tip of the nose, which yielded to treatment after four years; two years later he began to suffer from a chronic nasal catarrh, and later on he developed a tuberculosis in the form of an enormous nasal tumor. Now, if it be true, as some dematologists, for instance Neisser,[28] Bloch,[29] and others claim, that lupus of the face, as a rule, if not always, is caused by a previous lupus of a mucous membrane, we may have had in Hahn's case first a lupus of the mucous membrane of the nose, later a lupus of the external integument of the nose, which in its turn finally gave rise to a nasal tuberculosis. If such changes are possible, and everything points to the fact that they do occur, it is hard to conceive how exact microscopical border-lines could be drawn. Our own case No. II., presents a combination of lupus faciei and tuberculosis nasi, somewhat like that of Hahn.

The *course* of tuberculosis of the nose, as a rule, is very protracted, provided it does not occur during the last stages of pulmonary tuberculosis, when the phthisis, of course, leads to rapid fatal termination. Cases, however, not complicated with phthisis, may last for many years. In Riedel's case (Table, No. 6) the patient stated that he had been suffering from ulcerations of the nose for twenty-seven years. Some of our own cases (Nos. I., II., III., IV., etc.) were of a very protracted course, and had been under observation and treatment for years. However, even primary tuberculosis may lead to a very quick fatal termination, as shown by Demme's case (Table, No. 15), of a boy eight months old, who died inside of a few days from a tubercular meningitis, consequent and doubtless dependent upon the nasal tuberculosis. As a rule, however, the *prognosis*, as far as life is concerned, is good; tuberculosis of the nasal mucous membrane is in itself not dangerous to life. Possibly it may also eventually lead to a miliary tuberculosis; a case reported by Capart (Table, No. 62) indicates such a possibility. As far as a complete and permanent *restitutio ad integrem* is concerned the prognosis is decidedly bad, because most cases lead again and again to relapses.

The *treatment*, if it shall have any chance to bring about a permanent recovery, must be a radical one. Superficial cauterization, or the insufflation of antiseptic powders, is of no avail. The new growths must be removed as thoroughly as possible; then a permanent result may be looked for with some degree of probability. We see, for instance, that one of Capart's cases was permanently cured. The tumor in this instance

was believed to be of a sarcomatous nature, consequently a very radical and extensive operation was made, and the result was good. In our case No. III., the frequent occurrence of relapses was only checked by opening up the nose, dividing it during chloroform narcosis from the outside, and scraping it out with the sharp spoon.

Ulcerating surfaces ought to be either scraped or cauterized energetically with chromic acid, trichloracetic acid, etc., or the galvano cautery; and to the wounds, during and after treatment, antiseptics, such as iodoform, iodol, aristol, or europhen, should be frequently applied. I think it would be an excellent plan to give, during such a course of external treatment, creasote in large doses internally, as I succeeded even in an advanced case of phthisis in bringing about a perfect healing of tubercular ulcerations in the nose. How long this good local result in this case (No. X.) will last I am, of course, unable to state.

The *complications* which we meet in nasal tuberculosis are, as already in part stated above, pulmonary and laryngeal phthisis (mentioned twenty-five times in our table); tuberculosis of the pharynx, palate, and tongue (ten times); lupus of the face and nose, tuberculosis of the skin, chronic eczema of the face (twelve times); tubercular meningitis and miliary tuberculosis (each once); empyema of the antrum of Highmore (twice); suppurating and enlarged tuberculous cervical glands. A very important complication to which I want to refer, with some details upon which no writer on the subject of tuberculosis of the nasal mucous membrane has as yet laid stress, is, that with obstinate cases of dacryocystoblennorrhœa, with tuberculosis and lupus of the excretory duct of the lachrymal apparatus and the conjunctiva, in a combination of nasal with conjunctival tuberculosis, the former may be the primary or the secondary factor. A very interesting case, investigated very fully, is that reported by Knapp (Table, No. 43), a tuberculosis of the conjunctiva of the left eye, in a male nineteen years old. The tubercular nature of the lesion was proven microscopically and by animal experiments. Knapp found in his patient cicatrices of former ulcers in the nose, which had been treated surgically. He believes that these former ulcerations were of a tubercular nature, and says: "In our case it is possible that the infectious material was transmitted from the meatus of the nose through the lachrymal canal into the conjunctival sac. This way of propagation is probable by the development of tubercular ulcers around both puncta lachrymalia." Fick (Table, No. 45) reported a case of tuberculosis of the nasal duct of the left eye, and, on examination, it was found that the nasal septum on its left side presented tubercular ulcerations. Haab (*loc. cit.*, Table, No. 46), in the discussion which followed the report of Fick's case, stated to the Zurich Medical Society that he had presented to it two years previously a case of tuberculosis of the conjunctiva complicated with nasal tuberculosis. (I am unable to find a detailed report of this case.)

In both of the two last cases, as well as in Knapp's case, the nasal tuberculosis was looked upon as the primary affection. In one of Hahn's cases (Table, No. 41) blepharitis ulcerosa is mentioned as one of the complications of this class of nasal tuberculosis. There is hardly any doubt that this ulcerative blepharitis was one of tubercular nature, as the patient is described as being of a general scrofulous habitus. It is not stated whether the nasal or the conjunctival lesion was looked upon as the primary trouble. In our own cases we find a dacryocysto-blennorrhœa in No. I., on the left eye, which had preceded the nasal tuberculosis of the same side for eight years.

A lupus of the inner canthus of the right eye, lupus of both naso-lachrymal ducts, and tubercular lesions in both nasal cavities are found in case No. II.; tuberculosis of the naso-lachrymal ducts of both sides, and nasal tuberculosis, are found in case No. V.; a dacryocysto-blennorrhœa of an obstinate nature, and of two years' standing, is found in case No. VIII.

There can be no doubt, of course, as to the intimate connection of nasal tuberculosis with conjunctival tuberculosis or tubercular disease of the naso-lachrymal duct. Whether the supervention of an obstinate dacryocysto-blennorrhœa in cases of nasal tuberculosis is only a coincidence, a predisposing factor, or whether these suppurative processes were caused by a tubercular invasion, and stand to the nasal tuberculosis in a direct relation, is a question which must be left open at present. It is certainly of great practical as well as scientific import to find a respectable number of our tabulated cases of nasal tuberculosis complicated with tuberculosis of the naso-lachrymal duct or the conjunctiva.

If we now try to formulate the results of our investigation upon the subject of tuberculosis of the nasal mucous membrane, we come to the following conclusions:

1. Tuberculosis of the nasal mucous membrane, compared with tuberculosis of other parts of the respiratory tract, preferably with this affection of the lungs and larynx, is a rare disease; it is, however, not as rare as formerly supposed.

2. It is generally a secondary affection, but also occurs primarily, as proven by unmistakable clinical evidence and by post-mortem facts.

3. Where it occurs it is frequently secondary to pulmonary and laryngeal phthisis.

4. It occurs in the form of ulcerations, tumors, and a combination of both. The tumor is generally found in primary cases, while the ulceration is the prominent factor in advanced cases of phthisis.

5. It may occur at any age (except, probably, in the very earliest months of life), preferably at the ages between ten and forty years.

6. It does not show any predilection as to sex.

7. Its seat is preferably the septum cartilagineum.

8. Its course is very chronic, and relapses even after surgical interference are the rule.

9. It is, *per se*, not dangerous to life, but may eventually lead to fatal complications, such as basilar meningitis, and possibly miliary tuberculosis.

10. One of its most important direct complications by continuity, is that with tuberculosis of the naso-lachrymal duct and the conjunctiva.

11. It may also be complicated with tuberculosis of the pharynx, palate, tongue, external integument; lupus of the nose, face; tuberculosis of the cervical glands, empyema of the antrum of Highmore, etc.

12. Lupus of the face, or of the nasal mucous membrane, may in its further development lead to tuberculosis of the nasal mucous membrane.

Before closing this paper, it is my agreeable duty to most heartily thank my honored teacher and former chief, Privat-docent Dr. Otto Seifert, at Wuerzburg, to whom I am indebted not only for the permission to make use of, and to publish entries from the record-books of his polyclinic, but who also granted me the privilege of taking across the Atlantic his microscopical specimens of some of the above new cases. This has enabled me to give a full description of the microscopic pathological anatomy of nasal tubercular tumors.

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PELIOSIS RHEUMATICA IN A BLEEDER.

By T. D. Dunn, M.D.,
PHYSICIAN TO THE CHESTER COUNTY HOSPITAL, WEST CHESTER, PA.

Through the kindness of Dr. Okie, of Berwyn, I present the report of this interesting case of peliosis rheumatica. Dr. Okie has given me the following notes made of the case prior to consultation with me:

"I first saw Robert L., aged eight and a half years, January 5, 1893. Found slight congestion at base of both lungs. Carbonate of ammonium, counter-irritation, and cotton packing were prescribed.

"He was much better next day. I then noticed discoloration at top of right ear. As the weather was intensely cold, I supposed it had been frost-bitten. January 7th, ear much worse, discolored and enlarged, with many spots appearing on face, neck, and thighs. Pain in knees and ankles. Was then told for the first time that the boy had complained of pain in knees several days before he was taken sick. Put patient on salicylic acid and soda, 2½ grains each, every two hours, and wrapped the joints in cotton; also gave tincture of chloride of iron, 20 drops, with acetate of potassium, 2 grains, every four hours. Temperature 102⅘°; pulse 120."

Condition, January 8th, when first seen by me: Pain in joints improved but joints still tender and motion painful. Temperature 102°;

pulse 120 and feeble. Purpuric spots present on both ears, cheeks, neck, shoulders, back, legs, and ankles, and some spots over trunk; also spots seen on gums, roof of mouth, and throat, which was sore. Swallowing painful and nourishment taken with difficulty. Ears, lips, eyelids, and chin greatly swollen and tender; conjunctivæ ecchymotic and œdematous; some vesicles formed on right ear and cheek, but no tendency to exu-

dative erythema or urticaria. Slight bronchial cough, but no pulmonary congestion.

January 11. Slight increase of pain in joints, which quickly yielded on return to salicylic acid. The pain preceded the appearance of a few fresh purpuric spots. Temperature 100°; pulse 108. On account of weakness he was given, by suppository, quinine, digitalis, and small doses of opium.

13*th*. Swelling of ear, chin, and eyelids diminished, and general condition much improved. The accompanying photograph was taken on the eighth day of the disease.

17*th*. Swelling of joints and tumefaction of face had entirely subsided. Temperature normal; pulse 100 and feeble. Liquid nourishment taken freely. No diarrhœa or mucous hemorrhages. Anæmia marked. Examination of blood showed 3,000,000 corpuscles to the cubic millimetre, in proportion of 1 white to 500 red; hæmoglobin 60 per cent.; numerous microcytes 1½ to 3 micro-millimetres in diameter. Under continuance of iron, general tonics, and a nutritious diet, the patient rapidly improved, and February 1st, notwithstanding marked anæmia, was able to walk about the house.

The subject of this interesting clinical picture is the sixth of a family of seven boys. They, as well as the father, suffer more or less from rheumatism in joints and muscles, but have no articular deformity. No tendency to hemorrhage has shown itself except in this little patient and an older brother, aged fifteen years. These have had frequent attacks of epistaxis from infancy and severe hemorrhages after trivial injuries. In 1888 I opened a large axillary abscess for Robert, which bled for some time. A profuse bleeding, lasting several days, followed the extraction of a tooth. An operation, which I performed on the father in 1890, for necrosis of sternum, was not attended by unusual hemorrhage. Neither father nor grandfather of the patient was a bleeder. The grandfather, however, came from a very remarkable bleeder family, which I reported in THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES, January, 1883. Of his three brothers, Mordecai died of hemorrhage of the stomach at forty; George, from same cause, at twenty; and Davis, from hemorrhage following venesection, at twelve.

Professor Osler, in his *Practice of Medicine*, p. 318, states that "Schönlein's peliosis is thought by most writers to be of rheumatic origin; and certainly many of the cases have the characteristics of ordinary rheumatic fever, plus purpura. By many, however, it is regarded as a special affection of which the arthritis is a manifestation analogous to that which occurs in hæmophilia."

This case certainly supports the latter view—as does the fact that the disease sometimes appears in several members of the same family.

REVIEWS.

HANDBOOK OF THE DIAGNOSIS AND TREATMENT OF DISEASES OF THE THROAT, NOSE, AND NASO-PHARYNX. By CARL SEILER, M.D., Instructor in Laryngology and Lecturer on Diseases of the Upper Air-passages in the University of Pennsylvania; Chief of the Throat Dispensary at the University Hospital; Physician-in-Chief of the Union Dispensary, etc. Fourth edition, thoroughly revised and greatly enlarged. Illustrated with two lithographic plates, containing ten figures, and one hundred and seven wood engravings. In one 12mo. volume, pp. xii., 396. Philadelphia: Lea Brothers & Co., 1893.

WE must congratulate the author and the publishers upon the success which this little work has attained in reaching its fourth edition since 1879. The volume is very convenient in size and profusely illustrated with more than fifty pages of woodcuts, which lend additional clearness to the text. Although this edition is advertised as enlarged and revised, we regret that the enlargement is on minor points, to the exclusion of many important divisions of the subject, and that many grave errors have been overlooked in the revision. Thus we note that less than a dozen lines are given to the consideration of the ear, with which diseases of the upper respiratory tract are so indissolubly connected; and diseases of the accessory sinuses are barely mentioned, while thirty pages are devoted to an elaborate disquisition on the formation of the voice.

In the opening chapter there is an interesting synopsis of the history of laryngology, and of the phases through which the laryngoscope has passed before arriving at its present perfection. Chapter II., "The Art of Laryngoscopy," gives the beginner excellent practical rules for making all the necessary examinations of the throat and nose, and points the way by which many faulty methods and positions may be avoided. The "mechanical diagram" in Chapter III. will serve a very useful purpose in explaining the complicated action of the intrinsic muscles of the larynx, so difficult for the average student to grasp. In this chapter and elsewhere mention is made of the "cartilages of Seiler," as if they were true sesamoid cartilages found in the vocal cords; Luschka, however, describes the fibro-cartilaginous points of the *processes vocales* of the arytenoid cartilages as occupying their position. Chapter IV. deals with the physiology of the larynx and nose, and we are glad to see that the important part performed by the nose in the respiratory function is recognized and brought up to our present knowledge. Chapter V., on instrumentation, closes this division, and the following pages are taken up with the special subject-matter of the book.

Although most of the diseases are treated with equal detail, we find a mere hint of follicular or lacunar tonsillitis, and no mention whatever of the lingual tonsil and of the important *rôle* it plays in reflex neuroses

of the throat, while the author has given us his views on influenza in an encyclopædic treatise. In a work of this size the minute structure of normal and pathological tissues cannot be dwelt upon in detail, and the author wisely refers students to larger works on the subject for such information. But we should like to have seen the pharyngeal tonsil spoken of as *lymphoid* in structure and not glandular, as it is here erroneously stated to be. Then, too, in the removal of hypertrophies of this growth, we think the curette should have been mentioned, as this is the instrument most commonly used.

It will confuse the student not a little to find clergymen's sore-throat placed under the head of chronic laryngitis, when it has so long been recognized as the synonym of follicular pharyngitis. On pages 205 and 209 we find in the treatment of that rare condition, adhesion of the vocal cords—here, however, mentioned as of frequent occurrence—the advice to cut the cords apart and prevent reunion by *requiring the patient to talk or read aloud during the healing process!* And though here, if anywhere, we might reasonably expect some reference to intubation, this important subject, as well as tracheotomy, is dismissed with a few words.

We deplore the frequent advice of the use of cocaine, especially in hay fever, and feel that most authorities are with us in condemning the use of the nasal douche and the practice of "sniffing" solutions up the nose, both so dangerous to the ear, but here so often recommended.

The tables of symptoms of diseases of the throat in the final pages of the book are excellent, and, being almost identical with those furnished by Lefferts to his students many years ago, we feel sure are thoroughly reliable. W. J. F.

RESEARCHES IN FEMALE PELVIC ANATOMY.

TUBO-PERITONEAL ECTOPIC GESTATION. By J. CLARENCE WEBSTER, B.A., M.D., M.R.C.P. Ed., Assistant to the Professor of Midwifery and Diseases of Women in the University of Edinburgh. Edinburgh and London: Young J. Pentland, 1892.

IN these atlases, with descriptive text, Dr. Webster has embodied the results of sections and dissections upon women dying in pregnancy or in the puerperal state. The larger of the two works (*Pelvic Anatomy*, pp. 124) is based upon cases in the first, second, third, fourth, sixth, and fifteenth days of the puerperal period. Then follow the results of dissections of the pelvic floor, the book concluding with studies of a case of pregnancy (fifth month) complicated by ovarian cyst.

We do not recall a more valuable and interesting study of the puerperal period and its phenomena than that afforded by the first portion of this work. The sections were made most successfully, and the colored plates are clear and interesting. Their study emphasizes in the mind of the reader the relation between the lower uterine segment and the upper, and also the cervix. It is interesting to note how soon the lower segment vanishes and how anæmic the uterine muscle becomes after labor. In contrast with this is the engorged cervix and abundant sinuses in the peri-uterine tissues, affording ready access and develop-

ment to septic germs introduced at or shortly after labor. The study of these plates affords a picture of the size and shape of the recently emptied uterus, which should be in the mind of the obstetrician when douching, curretting, or manually exploring the uterus after labor.

A most interesting point developed by Dr. Webster is the almost impacted situation of the recently emptied uterus in the pelvis. By retraction of the uterine muscle and pressure of the pelvic walls the womb is so compressed that hemorrhage is prevented and its sinuses tightly closed.

In studying the position of the pelvic viscera about the uterus it is shown that the ovaries do not assume definite position corresponding to the rotation of the pregnant uterus on its long axis. The author further finds, in the anatomical arrangement of the pelvic viscera after labor, no reason for fearing compression of the ovaries during Credé's expression of the placenta, and ascribes such cases to pain caused in neurotic patients by uterine pressure in many cases where pelvic inflammation has left the uterus and its surroundings in a pathological condition. He regards as the safest grasp for compressing the uterus the hands, radial edges together, thumbs in front of the vertebræ, fingers in median line in front.

An interesting account of the position of the bladder after labor is also given.

In discussing the pelvic floor, attention is drawn to the fallacy of depending on section alone for an accurate idea of its structure. Dissection is regarded as a valuable and tried method of study. The author differs from the conclusions of Hart in that he considers the entire mass at the bottom of the abdomen, including the uterus and surrounding viscera, as opponents to intra-abdominal pressure, and hence as comprising the pelvic floor. He further calls attention to the pelvic fascia as most important in giving strength and support to pelvic contents.

An interesting section on the pelvis in the beginning of the fifth month of pregnancy, illustrated by a colored plate of a frozen section, concludes the volume on Pelvic Anatomy.

In the second of these books Dr. Webster describes and beautifully illustrates sections and microscopic studies of the body of a primipara who died after the removal through abdominal incision of an ectopic fœtus. The variety of gestation is styled "tubo-peritoneal," and at its occurrence the case was unique. Two sacs were present, one containing the fœtus, the other the placenta. The ovum began to develop in the left tube, which prolapsed in front of the left broad ligament, growing both upward and downward. In the early months of pregnancy the sac wall burst and the fœtus, with unruptured amnion, escaped into the peritoneal cavity. The amnion became attached to the peritoneum, whose thickened epithelium formed a secondary sac wall. Polyhydramnios was present. The placenta remained in the dilated tube, the umbilical cord and amnion connecting the two cavities. The intestine and omentum were matted together about the fœtal sac. Clinically, the case was of interest because of the little pain which the patient suffered after rupture of the tube and escape of the ovum. Her general condition was poor, and gastric and intestinal disturbance was present. During the early months there were no signs to lead to a correct diag-

nosis. Before operation the variety of ectopic pregnancy present could not be told. Spurious labor occurred just before operation. The uterus was enlarged, the cervix open, and decidua was present. Death resulted from uræmic poisoning, induced by pressure of the emptied sac and retained placenta upon the bladder, urethra, and ureters. The fœtus died before operation. E. P. D.

THE CARDINAL SYMPTOMS OF URINARY DISEASE, THEIR DIAGNOSTIC SIGNIFICANCE AND TREATMENT. By E. HURRY FENWICK, F R.C.S. London: J. & A. Churchill, 1893.

THIS admirable series of lectures inaugurates a new departure, at least in genito-urinary surgery, from the fact that the classification is not based upon diseases, but upon symptoms and symptom-groups. This is extremely serviceable.

Most of the urinary diseases are grouped under four cardinal symptoms: hæmaturia, undue frequency of micturition, abnormal urination, and pain and reflex neuroses.

In the introduction to the book a glowing tribute has been paid to the value of the electric endoscope, and yet the author has very justly stated that this instrument is unsuited for the requirements of the general practitioner. Fenwick's work presents, in part at least, the results he has formulated from his patient urethroscopic studies. Combined with the text are the histories of many cases illustrating the teachings of the author and the good effects which can be expected from intelligent treatment. At the end of each section there is tabulated a diagnostic synopsis. Thus, after an admirable discussion of the causes, symptoms, and treatment of hæmaturia, comes a table headed "Rules for Ascertaining the Source of Hæmaturia." These are somewhat dogmatically stated, perhaps too much so for scientific accuracy. They are very clear, directly to the point, and above criticism, as representing a tabulation for clinical teaching.

As would be expected, most attention is devoted to undue frequency of micturition. The frequency of quantity and the frequency of irritability are severally tabulated. The treatment under this section is particularly full. In undue frequency from pyelitis systematic irrigation of the ureters is suggested.

Cystitis is very briefly considered, as is its treatment, while ulcers of the bladder receive particular attention.

The treatment of posterior urethritis is fully discussed. The author states, when on the subject of prostatic irritability, that when the prostate of a man who has masturbated freely, and in whom the testes are soft and small, is examined, the lobes adjoining the median line are soft and shrunk, so that instead of a median convexity the finger encounters a median concavity. This cupping, or saddling of the prostate he terms "onanitic prostate," though he does not hold that it points solely to the habit of masturbation. In considering the frequency of micturition in large prostates it is quite positively asserted that enlargement of the gland precedes the loss of power of the vesical muscle and the collection of residual urine, and many cases are cited where with distinct prostatic

hypertrophy there was little or no urine remaining in the bladder after micturition.

In discussing the treatment of enlarged prostate with considerable amount of residual urine, the dangers of catheterization are fully pointed out, and the statement is made that no amount of scrupulous care and forethought, no attention to detail, can prevent a mortality in these cases. A certain percentage will die. In this opinion most men of wide experience will concur. The operative treatment of these cases is fully considered.

Perhaps in the chapters on Pain and Reflex Neuroses, Fenwick is most original. He has gone far beyond Ultzmann in this direction, and presents an admirable study of what must have been a peculiarly rich clinical experience.

The book ends in a chapter upon what is termed Abnormal Urination. He summarizes his views on the subject in a tabular form under the headings Abnormal Urination, Impossible Urination, and Uncontrollable Urination.

As a general criticism it may be said that after a careful reading of this book one feels that it has been somewhat unnecessarily cumbered by case records; that there is a somewhat surprising faith as to the efficacy of drugs, and that in the zeal for classification facts have sometimes been treated with little ceremony. Nothing else unfavorable of the work may be said. It is original, it is most independent, it puts well-known facts in a new light, and it will add new laurels to the distinguished writer, whose reputation has no need of further heralding. E. M.

DU TRAITEMENT PAR L'ELECTROLYSE DES DÉVIATIONS ET ÉPERONS DE LA CLOISON DU NEZ. Par J. BERGONIÉ, Professeur à la Faculté de Médecine, Chef du Service Electro-thérapique à l'Hôpital Saint-André, et par E. J. MOURE, Chargé du Cours de Laryngologie, Otologie et Rhinologie à la Faculté de Médecine. O. Doin, Éditeur, 8 Place de l'Odéon. Paris, 1892.

TREATMENT OF DEVIATIONS AND SPURS OF THE NASAL SEPTUM BY ELECTROLYSIS.

THIS pamphlet, of about sixty pages, is distinctly a work for the rhinologist, and, though it does not present much that is original on the subject, he cannot fail to benefit by its perusal. The removal of septal spurs by electrolysis is an uncommon operation in this country, and anyone wishing to make a thorough study of this means of operating could not do better than give this article a careful reading, for the authors make a clear and comprehensive statement of the whole subject. It abounds in practical points, and sufficient cases are introduced fully to illustrate the different methods.

The first half of the book contains a *résumé* of the anatomy of the nose and of the irregularities of the septum, and a historical review of the usual methods of operating upon spurs and ridges. The remainder of the book is devoted to a thorough description of the various modes of applying electrolysis, and of the necessary instruments, and contains all that is essential to the perfect understanding of its use in these cases.

For the introduction of this valuable method in rhinoscopic operations we are indebted to Miot, who first proposed it in 1888. He uses both the monopolar and bipolar systems, but inclines toward the former in his practice. Bergonié and Moure, however, highly favor the bipolar method, and report results which would seem to substantiate their opinion They assert that by the bipolar method, *i.e.*, inserting both negative and positive needles into the obstructing angle, one séance is sufficient (although the eschar may not separate for fifteen or twenty days), subsequent perforations are avoided, and but little pain is caused. On the other hand, by the monopolar method, *i.e.*, the positive pole applied to the spur or ridge and the negative attached to a plate on the opposite side of the septum, much pain is caused during the operation, lasting for several days afterward, the current cannot be so carefully estimated and controlled, and perforations are of commoner occurrence.

The illustrations are excellent, and, contrasting the work with so much that is written on rhinological subjects, this comes to us as a refreshing change, the subject being comparatively new and full of suggestions. W. J. F.

CRÉASOTE ET TUBERCULOSE: REVUE GÉNÉRALE. Traitement de la Tuberculose pulmonaire par la Créasote administrée par Voie rectale. Par le DR. HENRI AUDEOUD, Médecin diplomé de la Confédération Suisse; Assistant à la Clinique médicale de l'Université; Médecin interne à l'Hôpital Cantonal. Pp. viii. 269. Genève: J. Studer, 1893.

CREASOTE AND TUBERCULOSIS. By DR. HENRI AUDEOUD.

THE numerous papers which have appeared in the current literature during the past fifteen years give evidence of the interest which the creasote question has aroused. Since their number is increasing each year, and their authors are not altogether in accord as regards methods or results, it is well for the practitioner to pause, review the literature and ascertain how far his work accords with the best that is done in the leading medical centres. The author commences modestly, claiming only that creasote and its derivatives should be included among the drugs which have given the least failures in the treatment of tuberculosis and which are almost universally employed. After giving the chemical and physical properties of the drug, he shows that in the first period of its use—1833 to 1877—the results were far from brilliant, from chemical impurity, insufficient dosage, and brief duration of treatment. After its reintroduction by Bouchard and Gimbert, the literature has become extensive, and the questions of method of administration, dosage, duration of treatment, and contra-indications have received due attention.

The author has shown an intimate acquaintance with the work of others, and gives an excellent *résumé*. He points out the true value of guaiacol as compared with that of creasote, and gives a brief consideration of the benzoate (benzosal) and carbonate of guaiacol, giving, however, the preference to good, rectified creasote. In reporting the biological experiments he shows that his view of tuberculosis is a broad one. The pathological physiology shows that creasote is mostly eliminated by the kidneys, and after a discussion of its mode of action, finally con-

cludes that it produces a substitutive irritation upon diseased tissues, and is a profound modifier of the respiratory system. All of the published statistics are reproduced in tables and are given very succinctly. In the second part we find a very strong argument for the administration of this remedy by the rectum. Every detail of duration of treatment, dose, formulas, precautions, are given with precision, and a table, showing careful painstaking observation of twenty cases, is given. In presenting his results he takes into consideration the general condition, body weight, fever, night-sweating, appetite, vomiting, diarrhœa, dyspnœa, cough, expectoration, bacilli, hæmoptysis, physical signs, nervous symptoms, urine, and menses. He believes that with care and observation of ordinary rules for rectal enemata, poisoning should not occur. A very excellent bibliography is appended. Although this work is ostensibly an argument for the administration of creasote by rectal enemata, it is really a monograph. The history has been so faithfully studied, the clinical work has been so carefully done, that it is a valuable addition to the literature of a drug which is likely to have a permanent place in the materia medica. The facts for the special method of administration are ably presented, but the whole subject is treated with so much breadth of scientific spirit that it merits our warmest commendation. R. W. W.

DISEASES OF THE RECTUM AND ANUS: THEIR PATHOLOGY, DIAGNOSIS AND TREATMENT. By CHARLES B. KELSEY, A.M., M.D., Professor of Diseases of the Rectum at the New York Post-Graduate Medical Schoo and Hospital; late Professor of Diseases of the Rectum at the University of Vermont, etc. Fourth edition, revised and enlarged, with two chromolithographs and one hundred and sixty-two illustrations. Pp. 490. New York: Wm. Wood & Co., 1893.

THE present edition of this excellent work, thoroughly revised, may fairly be said to present the recognized practice of the day, while the author expresses his personal views with much force. Forty opening pages are devoted to points in anatomy and physiology, and here a somewhat lengthy discussion as to the presence or absence of a third sphincter leads to the conclusion that this is only a band of the circular muscular fibres of the rectum. Some very sensible advice as to careful actual examination of cases would, if followed, remove much of the obscurity which often surrounds rectal cases in the minds of the general profession. "The man who acquires a reputation as a diagnostician in this department is the one who simply uses his eyes and his fingers, and refuses to deceive himself by jumping at conclusions in the dark."

The work is enriched by many brief illustrations from the author's experience, increasing very greatly its practical value. A noteworthy and valuable feature is the attention to minute detail in descriptions of treatment. The worn-out but most important subject of hemorrhoids is handled in an eminently practical way. In treatment, reliance is placed upon cold water and regularity of the bowels for the non-operative cases; and upon the clamp and cautery for those of graver type. The ligature he has largely abandoned.

Not a small difficulty which confronts the practitioner in the larger cities is the competition of the irregulars, who, by their advertisements

and by their undoubted success in many cases, have built up a prejudice among the laity against the "knife, ligature, or caustic." It is something of a consolation that the author, so well situated for forming an opinion, is confident that "as a popular remedy, the use of the carbolic acid injections has seen its best days." He says that the reaction in the public mind has already begun. Full details of this method are given. In 1885 he reported about 200 cases with very satisfactory results at that time, and for a year or more he used injections almost exclusively; but the fact that he has since had "a succession of bad and troublesome cases," has led him to largely abandon the method. He now uses it only "in selected cases where radical operative measures are for any reason contra-indicated." The following statement is significant (p. 188): "All of the patients I had supposed cured by this method, and upon whose cases I based my former favorable report, are now returning to be again cured by some lasting method."

The Whitehead operation, of excising the pile-bearing area, is not indorsed.

In the treatment of stricture of the rectum electrolysis deservedly receives but scant recognition. He has made careful trials in his own practice, suspects the reality of the "perfect cures" reported, and considers that in this condition electrolysis reduced to fact means either simple dilatation or the application of the cautery.

While it may be said that the work is defective in devoting attention to some operative measures, such as intestinal anastomosis, which it cannot, within its limits, fully treat, there is much that deserves hearty commendation.

Written largely from the standpoint of treatment in a very readable way, this enlarged edition cannot fail to increase the popularity which has already been attained by former issues. G. E. S.

LESSONS IN PYHSICAL DIAGNOSIS. By ALFRED L. LOOMIS, M.D., LL.D., Professor of the Practice of Medicine and Pathology in the University of the City of New York. Tenth edition, revised and enlarged. 8vo., pp. 278. New York: Wm. Wood & Co., 1893.

HAD Professor Loomis written a new work, instead of revising one which, in its day, was more than excellent, he would have done justice to his reputation and his subject. As it is, while the book remains useful, and within its limits reliable, it is not the best of which the author is to-day capable. Thus, for example, there is no reference to modern methods of examining the stomach and its secretions, or to the application of electricity in diagnosis; the section on the blood is hardly so full or explicit as modern knowledge requires; in the section on urinalysis no mention is made of cylindroids, of acetone, of diacetic acid, of the so-called diazo reaction. On the other hand, the original illustrations of actinomyces, tubercle, anthrax, and typhoid-fever bacilli, and the microphotograph of filaria sanguinis hominis, are worthy of special commendation. Beyond these points there is nothing to be said of a work that has lived, and deservedly so, to ten editions. Its merits of clear and terse statement, and its fidelity to clinical observation, have won and will retain its position as an acknowledged authority.

S. S. C.

PROGRESS

OF

MEDICAL SCIENCE.

THERAPEUTICS.

UNDER THE CHARGE OF

REYNOLD W. WILCOX, M.A., M.D., LL.D.,

PROFESSOR OF CLINICAL MEDICINE AND THERAPEUTICS AT THE NEW YORK POST-GRADUATE MEDICAL SCHOOL AND HOSPITAL; ASSISTANT VISITING PHYSICIAN TO BELLEVUE HOSPITAL.

Cocillana.

Dr. H. H. Rusby presents an elaborate paper upon the botany and pharmacology of this drug. It is a very valuable expectorant, possessing properties which are likely to make it one of the most important of the South American contributions to the resources of therapeutics. It belongs to the natural order *Meliaceæ*, of which the only representative in the United States is the *Melia azedarach*, or China-tree of the Southern States. The material used is the thicker bark from the trunks and large branches of the tree.

Dr. Virgil Coblentz has studied its chemistry and pharmacy. He found that it contained—1. A white crystalline body (hexagonal plates) soluble in ether, chloroform, alcohol, acetic ether, and glacial acetic acid; insoluble in alkalies. This body belongs to the so-called "camphor-like" bodies, or more properly, solid hydrocarbons. 2. A greenish-yellow fixed oil of a pungent, acrid taste and an earthy odor; soluble in ether, chloroform, alcohol, and turpentine. 3. An indifferent resin, as a white impalpable powder. 4. An alkaloid, in microscopic crystals.

Dr. Eccles found a red and a white resin, and an alkaloid of a light straw color, which was insoluble in water. The hydrochloride is soluble in water and entirely so in acid solutions.—*Bulletin of Pharmacy*, 1893, No. 8, p. 350.

[The dose of the tincture is ½ to 2 drachms; of the fluid extract, non-alcoholic, 5 to 25 ♏; of the syrup, 1 to 2 drachms.—R. W. W.]

Serum-therapy.

Dr. Albert Hammerschlag reports five cases in which he has made use of blood from patients who had recovered from typhus, as a remedy for this disease. By venesection (arm) he removes about five ounces of blood directly

into a sterilized glass cylinder, into which had been previously placed about a drachm of a sterilized 4 per cent. solution of sodium oxalate, which prevents the clotting of the blood. Direct transfusion, after preliminary cocaine injection, was practised, the arm being selected. At first the plasma was alone used; later, and after use of the oxalate solution assured the absence of sediment, the entire blood. He concludes that the transfusion of the blood of patients convalescent from typhus in patients suffering from that disease has no lasting effect; this conclusion, it is true, being based upon these few cases. Perhaps from the serum of animals which have, by means of the typhus bacilli, been rendered immune, a substance may be obtained which can be used as a remedy against typhoid fever. The late observations of Chantemesse and Vidal are that the use in typhus of the serum of animals rendered immune against typhus is without result.—*Deutsche medicinische Wochenschrift*, 1893, No. 30, S. 711.

The Action of Spermin as a Physiological Tonic.

Dr. Alexander Poehl, in 1891, had concluded that this remedy, when used subcutaneously, was a physiological tonic in all kinds of debility, neurasthenia, anæmia, etc. He found also that it had a specific action, not only upon the prostate and testicles, but also upon the thyroid, thymus, and pancreatic glands, and in addition upon the spleen and ovaries, and under normal conditions it circulates as a physiological constituent of the blood. His experiments show that spermin possesses the property, through its catalytic action, of increasing the diminished oxidation capacity of the blood, and of favoring the so-called intra-organic oxidation. He bases this conclusion upon—1. The behavior of metallic magnesia in the presence of spermin. 2. The restoring of the oxidation capacity of blood when it has been removed by chloroform, nitrous oxide, strychnine, free acids, and pathological urinary constituents. 3. The experiments of Tarchanoff on animals after section of the spinal cord. 4. The clinical observations upon patients suffering from deficient oxidation, anæmia, neurasthenia, scurvy, diabetes, cachexias, and the great proportion of diseases in which symptoms of auto-intoxication appear, that is, in which the products of retrograde metamorphosis of albumin accumulate in the organism. 5. The results of urinary analysis. 6. Observations on the biological properties of the cholera bacillus, when it was noted that the reduction manifestations which accompany the development of the cholera culture were absent.

The explanation of failures in the relief of certain diseases seems to lie in the insolubility, that is, the inactivity of the remedy. Recognizing the fact that Charcot-Leyden crystals are also composed of spermin-phosphate, and that these are found in diseases where deficient oxygenation is a prominent characteristic, as in asthma, leukæmia, typhus, pneumonia, and phthisis, the identity of these crystals with those of spermin-phosphate has been determined, and also the transition of the amorphous to the crystalline form, demonstrated. In this amorphous, difficultly soluble spermin-phosphate he finds the explanation of the failure of spermin to act upon intra-organic oxidation. It was further demonstrated, by the neutralization by phosphoric acid of an alkaline solution of spermin, that this insoluble, amorphous

salt was formed. Since the phosphoric salts are present in the organism in notable quantity, the acidity of the medium plays an important part in the determination of an active, soluble preparation, or whether the inactive form may be made, by a diminution of the normal alkalinity of the tissues or of the blood. The observations of Kraus are quoted, in which the relationship of the alkalinity to the blood to a decomposition product of lecithin is shown, and also his observation that in typhus, scarlet, pneumonic, and rheumatic fever, and diabetes, the alkalinity of the blood is diminished. Nerve tissue is especially rich in lecithin compounds, and irritation of this tissue results in the diminished alkalinity of the blood circulating through it. And it is quite likely that here the soluble may be changed into the insoluble spermin-phosphate. This fact explains the reason of the diminished intra-organic oxidation (auto-intoxication) as the result of diseases of the nerves, and gives an explanation of the good effects found after subcutaneous injections in the treatment of these diseases—that is, the oxidation is brought to the normal and the tissues freed from leucomaines. In the uric acid diathesis which accompanies diseases of the nerves and in gastric catarrh we may also expect benefit. At the same time the action of the spermin may be assisted by remedies which increase the alkalinity of the blood, as Carlsbad, Cur, or alkaline waters, Vichy, Bilin, or Ems.—*Berliner klinische Wochenschrift*, 1893, No. 36, S. 873.

Myxœdema treated by Thyroid Feeding.

Mr. James Adams reports two cases. The first within six weeks lost the slowness of thought, speech, and movement, and was able to knit easily, though not able to do heavy work. The myxœdema and feeling of cold disappeared, and she became active and buoyant. Menstruation did not return, but there was a profuse growth of hair. In the second case the œdema of the eyelids disappeared within the first week, the backache was gone, and she could easily climb stairs within a month. The method adopted was to mince fresh thyroid and administer it in a sandwich of bread and butter flavored with pepper.

The eighth of an ordinary sheep's thyroid, thrice weekly, seems enough, at least, to begin with; for great difficulty was found in getting the patients to continue the treatment during the first fortnight owing to unpleasant symptoms, probably due to too large a dose, though perhaps partly owing to rapid elimination of accumulated waste products. It is evident that the treatment must be kept up, for an intermission is likely to be followed by a return of the symptoms.—*The Glasgow Medical Journal*, 1893, No. 3, p. 196.

The Influence of Injections of Sodium Chloride upon the Absorption of Fluids.

Drs. G. Gaertner and A. Beck have undertaken to solve the problem whether, after bringing an increased amount of salt into the blood by injection of sodium chloride into the veins, there will be a more rapid absorption of water that has been artificially placed in the cavities of the body. Experimentally it has been found that dogs which had received injections of large

quantities of sodium chloride bear them without injury to their health, but soon thereafter suffered from great thirst, and took large amounts of water; otherwise nothing abnormal was remarked. The experiments were divided into two classes: 1. The absorption from the intestine. 2. The absorption from the serous cavities. The experiments showed that the over-salting of the blood hastens the absorption of fluid from the intestine and from serous cavities in very considerable quantities; while in from fifteen to thirty minutes in a healthy animal only a relatively small amount of water would be absorbed from a ligatured loop of intestine, in a similar time after a preliminary salt injection the whole or almost the whole of the fluid injected would be absorbed. The investigations as to the pleural cavities and as to the joints gave similar results. The results of the experiments are important because these intra-venous injections are harmless and give promise of better results than other methods of producing absorption in conditions which imperil the functions of important organs—in acute hydrocephalus, large pericardial effusions, in profuse diarrhœas which are seen in Asiatic cholera, in cholera nostras, and in certain intoxications. Theoretically this over-salting of the blood seems to be more rational than the usual intra-venous injection, for the latter only removes a temporary danger, while the intestines continue to remove the fluid from the blood. On the other hand, in cholera the objection may be urged that the absorption of the contents of the intestine would be a source of danger to the patient. It may be said that the very poisonous properties of this fluid have not been accurately determined, and besides at the height of the disease absorption from the intestine does not take place, and indeed this method does not prevent the irrigation of the intestine to be combined with it. Confirmatory of this theory is a single observation of Töpfer, who, in the last epidemic of cholera, sometimes made use of a concentrated sodium chloride injection in place of a physiological one, with the result that these cases showed favorable progress.—*Wiener klinische Wochenschrift*, 1893, No. 31, S. 563.

Chlorate of Soda in the Treatment of Cancer of the Stomach.

M. Brissaud has made use of the soda salt, which is more soluble than the potash and at the same time much less toxic. The daily dose has been from two to four drachms, without, however, exceeding the latter amount in the twenty-four hours. In several undeniable cases of cancer of the stomach the relief has been striking. In the five cases the patients are entirely cured, apparently, under this treatment, which has suppressed the melæna and the hæmatemesis; the appetite has returned, the cachexia has disappeared, and in three cases in which an appreciable epigastric tumor existed, this has disappeared in about six weeks. In forms that are epitheliomatous in their nature, this treatment seems to be successful; in others, the sarcomatous or of the interstitial variety, the treatment is unsuccessful. The same result is likely to follow in generalized cancer and in conditions in which treatment can have no influence. One case is cited where failure was observed; the liver was involved before treatment was begun. Of the latter, one death from phlebitis of the vena cava is an example. Since no notable elimination of this remedy has been observed after its administration, it is probably decomposed in the organism.—*La Mercredi Médical*, 1893, No. 35, p. 417.

The Treatment of Dysentery.

Dr. S. Schwarz has used, with success, sometimes a powder at others pills composed of chemically pure extracts and alkaloids of the following combination: Myrobalani, extract of triticum repens, pelletierin, extract of pomegranate and gum arabic. The difficulty lay in procuring the myrobalani free from purgative properties. This, however, has been overcome. The method of treatment is a daily dosage of nine pills, taken at three times, the amount for children being from one-fourth to three-fourths the adult dose. The diet is chiefly of meat, rice, and sago; boiled water, red wine, with or without water, weak tea, and black coffee are permitted. Milk is, however, forbidden. This diet must be continued for six to eight days, and the pills can be continued in diminished dose. As a prophylactic, two pills each morning and evening are sufficient. In acute and recent cases of dysentery it is proper to commence the treatment with a morning dose of an ounce or more of castor oil, and afterward to go on with the treatment as given above. —*Internationale klinische Rundschau*, 1893, No. 36, S. 1346.

[Neither the formula nor the dose of the remedies is given by the author Myrobalani from the *Myrobalanus emblica* is not a new remedy, for the fruit was in repute with the Arabians as primarily laxative and secondarily astringent in doses of from two to eight drachms.—R. W. W.]

A New Treatment of Tuberculous Peritonitis.

Dr. W. Nolen having noticed that merely the opening of the abdominal cavity with removal of the tuberculous exudation, even when antiseptics were not used, resulted in cure, attributed this result to changes in the condition of the circulation produced by the emptying of the cavity, and to the contact of the air in a chemical, physical, and bacteriological sense. The former cannot explain the result, because simple puncture with complete evacuation does not result in cure; therefore the latter appeared to be the probable explanation. Wegner having shown that the insufflation of air into the abdominal cavities of animals was harmless, he determined to make use of this method, taking the precaution to previously sterilize and warm the air. Three cases are reported in which combined aspiration and air sufflation resulted in success, in the sense that the ascites did not return. The advantage of this method over a cœliotomy are obvious: no chloroform narcosis, no incision worthy of the name, and impossibility of septic infection. The method of performance is as follows: A wash bottle of one quart capacity is two-thirds filled with distilled water, and provided with a rubber stopper, into which is inserted two bent glass tubes, one of which reaches nearly to the bottom of the bottle. This tube connects by means of a rubber tube with a glass cylinder filled with sterilized cotton, which in turn is connected to the short tube of a wash bottle, but of larger capacity. The long tube of this bottle is connected by rubber tubing with an irrigator containing a boric acid solution. The short tube of the wash bottle containing sterilized water is the one to be connected with the trocar, which is used for aspiration. The apparatus—trocar, wash bottle, glass cylinder, intervening tubing—must be sterilized before use. The trocar with its tubing in place

is inserted into the abdominal cavity midway between the umbilicus and the anterior superior spine of the ilium, and the ascitic fluid withdrawn into sterilized vessels, the distal end of the tubing being constantly kept under the surface of the fluid withdrawn. As soon as this is accomplished, the needle is withdrawn until its distal end can be placed against the parietal peritoneum; the end of the rubber tube, pinched together, is removed and connected with the short tube of the wash bottle, the plug of sterilized cotton, with which the tube had been stopped, having been previously removed. The reservoir containing the boric acid solution being now raised about twenty inches, its contents now flow into the empty wash bottle, the air therein contained, being filtered through the cotton contained in the cylinder, bubbles through the warmed, distilled, and sterilized water of the wash bottle and enters the abdominal cavity. As the air enters the cavity it is brought into intimate connection with the peritoneum and intestines by external pressure of the operator's hands. After five minutes the air is removed by aspiration, the reservoir being lowered to accomplish this. Some air can be left in the cavity without harm to the patient. There is no pain produced by the insufflation, and no accidents are recorded. One or two days after the operation the abdomen may show meteorism. The method has been followed in a single instance of tuberculous peritonitis by Mosetig-Moorhof.—*Berliner klinische Wochenschrift*, 1893, No. 34, S. 813.

Rest in Cardiac Affections.

Dr. T. Lauder Brunton believes that, as a remedial measure, rest frequently requires to be absolute; as a preventive one it may be only relative. The amount enjoined must be carefully proportioned to each case, as in advanced mitral disease, when the power of the heart is failing, absolute rest gives satisfactory results, in that the circulation recovers its balance, the arteries become filled and the veins emptied, the dropsical effusion and venous engorgement of the organs disappear, and the patients recover a fair amount of health. In cases of mitral disease incompetence may come about from (1) enlargement of the auriculo-ventricular orifice, (2) thickening of the valves or (3) incoördinated action of the musculi papillares. In the first case it may be hard to say if this be the sole cause of the regurgitation, without any obvious disease of the valves, as some disturbance of the relationship between the musculi papillares may tend to aid the regurgitation. In such hearts in growing boys and in chlorotic girls, comparative rest may be useful, and sometimes absolute rest may be almost essential. In some cases the former may be all that is wanted as a prophylactic measure. In chlorotic girls gentle exercise is advisable, but it must be carefully graduated, as exhaustion is likely to do harm. Massage may be useful, as it gives the patient exercise without putting any strain upon the heart. With a fatty heart gentle exercise may be advisable, as it may be more likely to bring about a healthy condition of the heart than absolute rest. When in mitral disease cardiac tonics, even pushed to their utmost limit, fail to give relief, then absolute rest becomes of great importance. Massage is of great usefulness in clearing out the body-waste, quickening the flow of blood through the muscles, and relieving the œdema, and the patient gets the advantage of the

exercise without overdoing his heart. It also allows the treatment to be carried out more easily than it would otherwise be, for it removes the feeling of weariness and irritability, fidgetiness and unrest of the patient.—*The Practitioner*, 1893, No. 303, p. 190.

THE following papers are worthy of notice:

"Chloralose, a New Hypnotic," by DR. SCHUIRER, in the *Wiener medizinische Presse*, 1893, No. 34, S. 1342.

An excellent though brief *résumé* of the literature of a remedy which bids fair to be an excellent substitute for chloral.

"Typhoid Fever and its Successful Treatment," by DR. J. HOBART EGBERT, in *Notes on New Remedies*, 1893, No. 4, p. 49.

A paper recommending the use of internal antiseptics and antipyretics, and containing many practical points.

"The Local Use of Essences in Surgery," by DR. JUST LUCAS-CHAMPIONNIÈRE, in the *Journ. de Méd. et de Chir. prat.* 1893, 11e Cahier, p. 401.

This paper is especially devoted to the essence of cinnamon and cinamol in retinol as local antiseptics.

MEDICINE.

UNDER THE CHARGE OF

W. PASTEUR, M.D. LOND., F.R.C.P.,

ASSISTANT PHYSICIAN TO THE MIDDLESEX HOSPITAL; PHYSICIAN TO THE NORTHEASTERN HOSPITAL FOR CHILDREN;

AND

SOLOMON SOLIS-COHEN, A.M., M.D.,

PROFESSOR OF CLINICAL MEDICINE AND APPLIED THERAPEUTICS IN THE PHILADELPHIA POLYCLINIC; PHYSICIAN TO THE PHILADELPHIA HOSPITAL.

SPONTANEOUS ANEURISM OF THE BRACHIAL ARTERY IN THE COURSE OF A VEGETATING ENDOCARDITIS.

AT the Twenty-second Congress of the French Society for the Advancement of Science, recently held at Besançon, LEGENDRE and BEAUSSENAT (*La Médecine Moderne*, 1893, No. 63, p. 792) reported the case of a woman, twenty-five years old, who, five months after a second attack of acute articular rheumatism, attended with violent palpitation and followed by a protracted and difficult convalescence, was suddenly seized with a sense of painful tingling in the upper extremity, a small tumor shortly afterward appearing at one point upon the arm. The woman became quite cachectic, and suffered a good deal from general pains, though only the right arm was tender upon pressure. Upon the inner surface of the arm at its upper third was a tumor about as large as an egg pulsating synchronously with the heart-beat. A rough, high-

pitched systolic murmur could be heard in the course of the brachial artery. There was a slight retardation of the pulse upon the right side, and a thrill could be felt upon palpation of the tumor. In the præcordium a thrill could be felt with the apex-beat, while a diastolic rumbling could be heard with duplication of the second sound. The general condition improved somewhat, but the local condition became aggravated; œdema appeared in the lower extremities, and the tumor increased in size. The temperature suddenly rose; the tumor further increased in size; the overlying skin became tense and red, and hemorrhagic phlyctenulæ appeared in the neighborhood of the swelling. Exploratory puncture showed that the tumor contained blood. The skin covering the tumor grew progressively thinner and finally ruptured, giving exit to a large quantity of clotted and liquid blood, so that it became necessary to apply compression to the subclavian artery, several hours after ligature of which the patient died. Upon post-mortem examination the tumor was found to be a diffuse aneurism, the limitations of which were formed by the skin and the brachial aponeurosis in front and the triceps muscle behind. The aneurism communicated with the brachial artery. The vein was also ruptured and its walls thickened, although it did not communicate with the artery. The heart presented a condition of vegetating endocarditis upon the free margins of the mitral leaflets. Sections of the brachial artery at different points disclosed the existence of an infectious arteritis in various stages of evolution, together with the presence of streptococci, which were also found in an infarct in the spleen.

Two Cases of Diabetes Mellitus and Cirrhosis of the Liver.

Palma (*Berliner klinische Wochenschrift*, 1893, No. 34, p. 815) has reported two cases in which the uncommon association of diabetes mellitus and cirrhosis of the liver was observed. One case occurred in a man, thirty-seven years old, without hereditary predisposition, who denied venereal infection, but who had used alcohol immoderately. For eighteen weeks there had been progressive weakness, with preserved appetite and increased thirst. The surface of the body generally presented a dark-brownish discoloration. The visible mucous membranes were icteroid. The thyroid gland was not enlarged. Heart and lungs presented no abnormality. Liver and spleen were enlarged. The urine contained a large amount of sugar and traces of acetone and biliary coloring mater, but no diacetic acid. The second case occurred in a man, forty-three years old, whose illness had begun four months before coming under observation, with slight jaundice in the absence of gastro-intestinal derangement. Soon there appeared abdominal pain with constipation followed by diarrhœa. At this time the abdomen began to swell and a sense of general weakness was observed. To these symptoms œdema of the lower extremities, with increased swelling of the abdomen and pain in the right hypochondrium, became added. Later the weakness became more profound, and shortness of breath set in. The surface of the body presented a blackish-brown pigmentation. The visible mucous membranes were icteric. The dependent portions of the body were œdematous. The liver was not enlarged and the spleen but slightly so. The urine contained varying quantities of sugar, acetone from time to time, and biliary coloring matter, but no

diacetic acid. Calomel was administered as a diuretic but proved inefficacious, paracentesis becoming necessary. The patient grew progressively worse, and finally died. Two days before the fatal issue sugar could not be found in the urine, and at the time of death neither acetone nor diacetic acid could be found, so that death must be ascribed to cholæmia. Upon post-mortem examination the liver was found to be small, firm, icteric, and granular; the kidneys and spleen enlarged and firm; the pancreas enlarged, but without morbid alteration. Expression is given to the opinion that the association of diabetes mellitus and cirrhosis in a given case can only be considered as a coincidence and of no further significance; and the justification for the designation of "bronze diabetes," sometimes employed, is denied.

The Etiology of Chronic Rheumatic Arthritis.

Schüller (*Medical Record*, No. 1194, p. 389) makes an interesting contribution to the study of the so-called rheumatic inflammations of the joints. In observations upon 116 cases of the kind named he found that the swelling and other external appearances were dependent upon a characteristic chronic inflammation of the synovial membranes and of the synovial villous excrescences, leading to hyperplasia. Mild cases may by imperceptible gradations assume the characters of the grave ones, with enormous proliferation of villous excrescences in the joint resulting in great deformity and impairment of function. In the inflamed tissues of the synovial membrane and of the synovial villous excrescences, Schüller has found short, thick bacilli, the central portions of which are notched or grooved, while the poles present a collection of bright granules. The organisms were also found in the freshly excised portions of joints of living patients, as well as in the synovial fluid itself. Cultures in various media proved successful. Injection of considerable quantities of the cultures was followed in rabbits by swelling and inflammation. After the death of the animals the joints treated were found to contain no pus, but to present the evidences of synovial inflammation similar to that found in man. The peculiar bacilli were also found in the joints and responded to the culture tests. Inoculation of other rabbits with the new cultures was attended with results similar to those already obtained. Other experiments also demonstrated that the bacilli do not cause suppuration. Injections of large quantities of the cultures caused death. Œdema developed at the site of the injection, and the bacilli could be cultivated from the œdematous fluid and in some cases from the blood of the right heart. The opinion is expressed that the organisms isolated are responsible for the inflammatory conditions found, to which a predisposition may be established by a previous attack of acute rheumatism or other inflammatory affection. It was observed that in many of the cases under observation there also existed chronic catarrhal conditions of the genito-urinary, nasal, and respiratory mucous membranes, so that it is possible that these may be the channels of invasion. The organism stains most readily with carbol-fuchsin, but is readily decolorized by acids, sometimes unduly so. The protoplasm of the organism is condensed in two parts, which are of a roundish, oval, or cylindric shape and lie closely together, being separated by a narrow, clear area. The bacilli measure from 2.26 to 2.76 μ in length, and from 0.75 to 0.95 μ in width. They

are not always perfectly straight, sometimes being slightly curved or angular. They are to be distinguished from tubercle bacilli both by their form and their behavior to stains and by their mode of development in culture. The organisms grow at a temperature a little higher than ordinary temperature, about 25°, though better at a somewhat higher temperature, but they must be kept in the dark. Stab cultures in gelatin in the course of two, three, or six days present small knobs or grains along the course of the puncture, followed by turbidity, which progresses to opacity, liquefaction finally taking place. Liquefaction also takes place in gelatin plate cultures. Small, whitish-gray, or membraniform spots form in cultures in bouillon, peptone, agar-agar, cooked potatoes, and sliced carrots.

The Diagnostic Significance of Herpes Labialis.

Felix Klemperer (*Berliner klinische Wochenschrift*, 1893, No. 29, p. 694) has made an interesting clinical and bacteriological contribution to the subject of the significance of herpes labialis in the differentiation of tuberculous from epidemic cerebro-spinal meningitis. He reports at length three cases of cerebro-spinal meningitis, in which the possibility of a tuberculous origin had to be considered. Two presented a family history of tuberculosis. One was complicated by pleurisy, with effusion. All presented herpes labialis. One terminated fatally; the post-mortem examination showed the condition to be non-tuberculous. In the other two recovery took place. In one of these only pneumonia cocci were found in the fluid of the vesicles; while in the fatal case uncapsulated diplococci were found that in bouillon culture formed chains. The results are also reported of examinations of the contents of herpetic vesicles of the lip in nineteen other cases. In fourteen cases pneumoni cocci, staphylococci, and streptococci were variously found, but in every instance only one form. In five cases in which the contents of the vesicles had already become turbid, streptococci and staphylococci were found. The conclusion is reached that the micro-organisms found in the fluid of the vesicles must be considered as the cause of the eruption, and, further, that they are the same as those causative of the primary disease. It is pointed out that herpes occurs commonly in the course of diseases (such as pneumonia and angina) caused by micrococci, or (such as rheumatism and endocarditis) in which micrococci cause secondary infection, and with but extreme rarity in the course of diseases (such as typhoid, diphtheria, and tuberculosis) that are dependent upon specific micro-organisms. The deduction is thus reached that the appearance of herpes labialis, in the course of an attack of cerebro-spinal meningitis, may be considered as indicating a non-tuberculous origin.

The Identity of the Streptococcus Pyogenes and the Streptococcus Erysipelatis.

Knorr (*Berliner klinische Wochenschrift*, 1893, No. 29, p. 699) has reported a case demonstrating the identity of the streptococcus pyogenes and the streptococcus erysipelatis. This identity has long been accepted by bacteriologists on morphologic grounds, but actual demonstration has hitherto been wanting. The case was that of a man, forty years old, in which, follow-

ing upon a slight injury of the great toe, a phlegmon developed in the region of the metacarpo-phalangeal articulation, suppuration of the joint subsequently ensuing, with intermittent fever, high temperature, and rigors. In spite of the evacuation of the joint the constitutional symptoms persisted. Several days afterward a large, painless, fluctuating tumor appeared upon the outer aspect of the right thigh, the skin covering which presented no indication of inflammatory change. On incision a large amount of pus was evacuated, bacteriologic examination of which revealed a pure culture of streptococci, which grew in bouillon into long chains and macroscopically gave rise to the formation of a scaly sediment, the supernatant fluid remaining clear. These micro-organisms proved actively pathogenic for mice. In the further progress of the case, other pyæmic abscesses developed upon both forearms, and suppuration took place in the left shoulder-joint. Evacuation of each of these accumulations failed to relieve the septic symptoms. Four weeks after the onset of the illness a severe rigor suddenly occurred, with elevation of temperature and the appearance of a typical erysipelatous eruption about a small bedsore over the sacrum. Two days later isolated erysipelatous eruptions appeared about the incisions that had been made, gradually extending for two days, when death took place. From a fragment of skin removed with most scrupulous antiseptic precautions from the periphery of the area of erysipelatous inflammation, a pure culture of streptococci was obtained, while tissue from an uninvolved portion yielded negative results. It was impossible to cultivate streptococci from the blood. The streptococci obtained from the primary abscess and those obtained from the area of erysipelatous inflammation were not only morphologically identical, but also behaved identically in cultures and in pathogenic virulence.

The Etiology of Acute Articular Rheumatism.

Sahli (*Deutsche Archiv für klinische Medicin*, Bd. li., H. 4 u. 5, p. 451) contends that although the infectious nature of acute articular rheumatism has not yet been demonstrated, such an etiology is highly probable from the point of view of modern general pathology. In favor of such a causation are the acute febrile course, the local involvement of the joints, and the tendency to complication by endocarditis and inflammation of serous membranes. Sahli reports the case of a girl, sixteen years old, with a second attack of acute articular rheumatism, complicated by endocarditis, pericarditis, bilateral pleurisy, and, finally, left-sided pneumonia, death suddenly taking place with cyanosis, perspiration, and heart-failure. At the post-mortem examination vegetations were found not only upon the leaflets of the mitral valves but also upon the aortic semilunar segments and upon the lateral leaflet of the tricuspid valve; the pulmonary leaflets were free. Inoculations were made upon agar and gelatin from the endocarditic excrescences, from the enlarged bronchial glands, the synovial membrane and the contents of an affected knee-joint, the thickened pericardium, the inflamed pleura, and from blood from the heart. In almost all instances pure cultures of a single organism developed, which corresponded in all essential characters with the staphylococcus pyogenes citreus. Animal inoculations yielded negative results. The conclusion is expressed that the organism found is to be looked

upon as the cause of the disease. It remains to be determined whether this organism is a distinct one or a modified form of the staphylococcus pyogenes citreus. It seems possible (and the possibility is supported by evidence) that acute articular rheumatism may be caused by attenuated pyogenic cocci, and future investigation must determine whether a single or several species of organisms have an etiologic relation to the disease. The bacteriologic examination in the case reported indicates that the so-called complications of acute articular rheumatism (endocarditis, pericarditis, pleuritis) were etiologically related to the primary disease, of which they were thus not complications but merely localizations. In numerous other cases of acute rheumatism subsequently examined, staphylococci were also found in the contents of affected joints and in the blood.

The Localization of Pure Word-blindness.

Dejérine and Vialet (*Compt.-rend. hebdom. des Séances de la Soc. de Biologie*, N. S. 9, t. v. No. 28, p. 790) have reported the case of an intelligent and cultured man, sixty-eight years old, who presented absolute verbal blindness both for letters and for words. There was loss of the comprehension of musical signs—musical blindness—while the ability to read figures and to calculate was preserved. There was no sign of verbal deafness, and no indication of difficulty in articulate speech. There was no mind-blindness and no visual aphasia. The power of mimicry was retained, as was also the ability to write spontaneously and upon dictation. Transcription was, however, imperfect and difficult. Motility was preserved, as was also general and special sensibility and the muscular sense. These symptoms had been present for four years. Death occurred suddenly, paraphasia and total agraphia having existed for two days without a sign of verbal deafness, and general intelligence and the power of mimicry remaining intact. Upon post-mortem examination an area of recent red softening was found in the inferior parietal convolution and angular gyrus of the left cerebral hemisphere; while areas of old, yellowish atrophic lesions were found in the lingual lobule, the fusiform lobule, the cuneus, and the apex of the occipital lobe, with secondary degeneration in the splenium of the corpus callosum, and pronounced atrophy in the optic radiations. The right hemisphere was perfectly intact. Upon histologic examination profound alterations were found in the posterior portion of the lingual and fusiform lobules, particularly in the collateral fissure. All of the white matter of these convolutions was destroyed and replaced by cicatricial tissue. The lingual lobe was apparently the less profoundly affected, though on microscopic examination its white fibres were found to be almost entirely disorganized; at the level of the lower lip of the calcarine fissure, however, a portion of the calcarine stratum had withstood the process of destruction. Advancing toward the cuneus the cortex progressively resumed its normal appearance. These characters indicated that the lesion was least pronounced at the level of the lower lip of the calcarine fissure, and was especially localized to the fusiform and lingual lobules. The lower portion of the ventricular cavity was likewise involved in the process of softening. The tapetum, the optic radiations of Gratiolet, and the inferior longitudinal fasciculus of Burdach were entirely destroyed. The

lesion became gradually less marked toward the outer wall of the ventricle. All of the structures in the descending branch of the calcarine fissure participated in the softening. From the anatomic findings in this case and from physiologic considerations the deduction is drawn that the lower portion of the inferior longitudinal fasciculus of Burdach contains physiologically differentiated fibres that connect the visual zone with the zone of language.

SURGERY.

UNDER THE CHARGE OF

J. WILLIAM WHITE, M.D.,

PROFESSOR OF CLINICAL SURGERY IN THE UNIVERSITY OF PENNSYLVANIA; SURGEON TO THE UNIVERSITY AND GERMAN HOSPITALS;

ASSISTED BY

ALFRED C. WOOD, M.D., INSTRUCTOR IN CLINICAL SURGERY, UNIVERSITY OF PENNSYLVANIA; ASSISTANT SURGEON, UNIVERSITY HOSPITAL.

AND

C. L. LEONARD, M.D., ASSISTANT INSTRUCTOR IN CLINICAL SURGERY IN THE UNIVERSITY OF PENNSYLVANIA.

THE PRESENT POSITION OF THE SURGERY OF THE HYPERTROPHIED PROSTATE.

AT the recent meeting of the American Surgical Association, WHITE (*Annals of Surgery*, 1893, vol. xviii., No. 2) presented an exhaustive study of the surgery of the hypertrophied prostate. The subject was considered under the following heads: 1. The nature and chief varieties of the prostatic enlargement and their relation to the vesical changes found associated with them. 2. The symptoms in relation to diagnosis and prognosis: (*a*) subjective; (*b*) objective. 3. The indications for (*a*) non-interference; (*b*) medical treatment; (*c*) palliative treatment; (*d*) operative treatment. 4. The choice of operation.

In considering the first of these headings, the theories of Guyon and Harrison were separately discussed and rejected as not offering satisfactory explanations of the condition; in fact, they seem to have been based on false premises. The analogy between the prostatic hypertrophy and uterine fibromyomata, pointed out by Velpeau, and later formulated by Sir Henry Thompson, is provisionally accepted as the best working theory thus far advanced. This conclusion intimately affects prognosis and treatment.

The prominent symptoms of prostatic hypertrophy, while not pathognomonic, are, when taken in connection with the history, fairly conclusive. They are: undue frequency of urination, particularly at night; difficulty in starting the stream; feebleness of the stream (a full stream, dropping almost vertically); interrupted micturition; incontinence of urine (retention with overflow), etc., the number and variety of the symptoms depending upon the nature and extent of the enlargement.

While digital examination by the rectum enables one to recognize a general enlargement of the gland, it does not afford any indication of the extent of encroachment upon the urethra. Obstruction of the urethra can most accurately be determined by the use of steel urethral bougies, or by silver or soft English catheters. If these instruments are arrested at a point more than seven inches from the meatus, the obstruction is in the prostatic urethra.

For purposes of treatment the character of the growth should be studied. A classification based on the following factors is suggested, not as being exhaustive, but as being useful in deciding upon the proper treatment. 1. The predominant character of the growth, whether *soft*, indicating excess of glandular and muscular elements, or *hard*, showing advanced fibroid change. 2. The seat of the growth. 3. The presence or absence of general sclerosis. 4. Infection of the vesical mucosa.

The consistence of the gland can most satisfactorily be determined by rectal palpation. The seat of the growth, whether affecting the middle or lateral lobes, will be best determined by the presence of residual urine in the former and its absence in the latter, and the difficulty experienced in passing an ordinary catheter in the former class of cases.

Expectant treatment is proper only in those cases in which the enlargement has produced no symptoms, in which catheterism is easy, and in which there is no residual urine. Medicinal treatment is useful principally in meeting the complications of prostatic hypertrophy. Palliative treatment consists in the use of steel sounds and the employment of the catheter. These measures are applicable to a large number of cases, and when systematically and carefully carried out frequently give great relief and enable the person to go for many years in comparative comfort. In more advanced cases, and in those in which palliative treatment fails to relieve the patient, surgical interference is to be advised, provided the condition of the patient is considered satisfactory. This should include the majority of severe cases, but advanced renal disease contra-indicates operation. The operative measures suggested are overstretching the prostatic urethra, perineal prostatotomy, perineal prostatectomy, and supra-pubic prostatectomy. The first three are applicable in a limited number of cases, the special indications being detailed, while in the majority of instances the latter is the operation of choice.

It occurred to the author that if the analogy between uterine fibromyomata and prostatic hypertropby was a real one, castration might have the same effect upon the latter that oöphorectomy has upon the former. Following out this thought, a large number of dogs were castrated and killed at varying intervals thereafter, and in every instance the size of the prostate was much less than the average in animals of the same weight, while, microscopically, the gland showed distinct evidences of atrophy. These results are confirmed by the observations of Bilharz and Pelican—that the prostates of eunuchs are extremely small—and those of Gruber and Civial, each of whom had the opportunity of examining the prostatic glands of a man who had been previously castrated—the latter observation having been made during the course of the operation of lithotomy. The researches of Hunter, Owen, and Griffiths on animals also confirm those of the author. The question of the value or the applicability of castration in cases of hypertrophy

of the prostate was left open, the author contenting himself with the simple statement of the facts.

Reduction of Dislocations of the Shoulder-joint by Manipulation.

Thomas (*British Medical Journal*, 1893, No. 1697), reports thirty cases of dislocation of the shoulder treated by manipulation. Of these twenty-four were reduced without difficulty, at the first attempt, on the day of the accident; they were dislocations into the axilla. The time required was from fifteen seconds to six minutes.

The method employed is a modification of that of Professor Kocher, and is carried out as follows: With the patient lying on his back, the operator grasps the hand of the injured side, takes hold of the corresponding arm immediately above the elbow with the other hand, flexes the elbow to a right angle, and then gently and firmly rotates outward the arm as far as it will go (*first stage*).

Rotation outward is maintained, and the elbow is carried to the patient's side (*second stage*).

Then, if necessary, the elbow is carried forward close to the curve of the thorax (*third stage*).

One piece of strapping fixes the elbow to the side, and the hand is carried in a sling.

Several of the dislocations were reduced in the first stage of the manipulation, the majority in the second stage, and others resisted until the third stage.

A New Method of Reducing Dislocation of Cervical Vertebræ.

Walton (*Journal of Nervous and Mental Diseases*, 1893, No. 9) refers to a case in which a dislocation of a cervical vertebra was successfully reduced by a method which he had previously pointed out, and which was based upon experiments upon the cadaver.

The commonest form of dislocation of the cervical vertebra, without fatal result, is that in which one articular process slips over the one below, producing a deformity corresponding with that observed in torticollis. The diagnostic feature of the former condition is the immobility of the head, without spasm of the muscles which produce this deformity.

The method of reduction is described as follows: Suppose the left articular process of one vertebra has slipped forward over the corresponding articular process of the vertebra below, and has fallen in the depression anterior to that process. This turns the face to the right and bends the head over toward the left, as in spasm of the left sterno-mastoid muscle. No amount of extension will remove the vertebra from its new position in the slightest degree, as has often been shown; nor will rotation be available until the depressed articular process is *raised*.

The proper method is simply, therefore, to first raise this process and then rotate. This can be accomplished only by extending the head obliquely backward toward the right, using the transverse process on the right as a fulcrum. The ligaments which have held the vertebra firmly in its faulty

position make no opposition to this movement, so that no force is required to first elevate in this way, and then to rotate to the proper position.

In bilateral dislocation it is quite probable that this manœuvre, carried out first on one side and then on the other, will meet with success. This is the movement, the author thinks, which has been made in those cases in which reduction has followed voluntary muscular action.

OBSTETRICS.

UNDER THE CHARGE OF

EDWARD P. DAVIS, A.M., M.D.,

PROFESSOR OF OBSTETRICS AND DISEASES OF INFANCY IN THE PHILADELPHIA POLYCLINIC;
CLINICAL PROFESSOR OF DISEASES OF CHILDREN IN THE WOMAN'S MEDICAL COLLEGE;
CLINICAL LECTURER ON OBSTETRICS IN THE JEFFERSON MEDICAL COLLEGE;
VISITING OBSTETRICIAN TO THE PHILADELPHIA HOSPITAL, ETC.

ASSISTED BY

WILLIAM H. WELLS, M.D.,

ASSISTANT DEMONSTRATOR OF CLINICAL OBSTETRICS IN THE JEFFERSON MEDICAL COLLEGE, PHILADELPHIA.

FIVE CASES OF ABDOMINAL SECTION AFTER CONFINEMENT.

ARMSTRONG (*Montreal Medical Journal*, 1893, No. 1) reports four cases as follows:

Case I. A woman pregnant three or four times, previous labors normal. Soon after getting up on the tenth day she became feverish, complaining of abdominal pain and soreness. During the next four weeks patient had a very fluctuating temperature, an occasional chill, frequent sweats and abdominal pain. On opening the abdomen the omentum was found adherent to the uterus and tube of the left side; and on carefully detaching the adherent margin, a pus-sac was found, the walls of which were formed anteriorly by the omentum, below by the left tube and ovary, and above by knuckles of intestine. The pus was removed, the tube and ovary carefully tied off, as well as fully one-third of the omentum. The patient recovered.

Case II. A woman confined of her second child, was attended in labor by a midwife. On seventh day developed a severe rigor, with temperature 104° and quick pulse. Examination disclosed a tender abdomen with a large mass in the left side of the pelvis, and a soft patulous os. No fluctuation could be obtained. Before section uterus was curetted and some decomposed placental tissue removed. Notwithstanding the great care used in opening the abdomen, the uterus was punctured. The contents of the left side formed one mass of inflammatory exudation, all the structures being glued together and adherent to the uterus and to the pelvic wall. The tissues were so friable and softened that it was with difficulty that ligatures could be applied without cutting. Before operation patient's temperature was 103⅘°, with a pulse of 130; the same evening, notwithstanding an operation of one

and a half hours, temperature had fallen to 99⅘°, pulse 110. On the evening of the eighth day, the temperature suddenly going up, a large pus-cavity was discovered which had followed the track of the glass drainage-tube. The result of this case also was favorable.

Case III. A woman at the end of her second puerperal period, which had been perfectly normal, was, after being given an enema, seized with intense abdominal pain with great general tenderness and vomiting. One small stool followed the enema, and her bowels did not again move. Symptoms of general peritonitis appeared, and on the following day the abdomen was opened for exploration. The woman died twenty-four hours after receiving the enema. At the examination of ovaries and tubes removed at the operation no marked change could be found. Careful search was made for volvulus and hernia, but no cause for these was discovered, and although water was injected into the rectum, all passed into the colon and ileum, none passing into the peritoneal cavity. The author not being able to make a post-mortem, could not conclude as to the cause of the trouble, but is inclined to think that a volvulus of the sigmoid was produced by the enema, which had untwisted, but not before some pyogenic micro-organisms had escaped into the peritoneal cavity.

Case IV. A healthy III-para. Two months after confinement, while nursing her child, was suddenly seized with a severe rigor, followed by abdominal pain and fever, which subsided in a week, only to recur in fifteen days. On operation a tubo-ovarian abscess on each side was found and evacuated. Patient made a perfect recovery.

In the fifth case symptoms resembling the above were present; this patient also recovered.

The writer thinks that greater caution against sepsis when attending confinements and miscarriages should be used. The technique of a case of midwifery should closely resemble that for a modern surgical operation. The experience gained from these cases demonstrates the utility of proper surgical treatment in properly selected cases.

The Employment of the Electrical Cupping-glass to Produce Abortion.

Mollath (*Centralblatt für Gynäkologie*, 1893, No. 26) reports a very interesting case in which electricity, by means of a cupping-glass, was employed to produce abortion. The patient was a multipara with a flat rhachitic pelvis. All her previous labors had been protracted, but otherwise normal. At her fourth confinement embryotomy had been performed on account of threatened uterine rupture. In her sixth parturition, a traumatic rupture of the uterus had taken place, this tear opening on the anterior and right side of the cervix wall and parametrium. The child was thrown into the abdominal cavity, being extracted through the tear. The woman recovered. Again becoming pregnant, the woman sought advice. On examination, a large amount of scar tissue was found extending along the vagina and cervix.

Abortion was decided on; the patient was then about three months pregnant. The electrical cupping-glass was used with the galvanic current, the application being made twice a day and for two minutes at a time, good

pains resulted, and in a few days the fœtus was expelled. The placenta was delivered manually. The woman did well. Eleven months afterward the patient again appeared, and pregnant. On examination the os was found firmly closed, uterus strongly retroflexed and moderately movable; patient was seven or eight weeks gravid. The cervix had a large amount of scar tissue and was very thin. After various methods of dilatation of the os had been tried, these methods extending over several days, galvanism was applied, five milliampères for twenty-five minutes (the constant stream three times in five minutes, with two pauses of five minutes' extent). Pains immediately began and continued for half an hour after the close of the sitting. This method was applied several times daily, the current being increased to ten milliampères at the ninth application. A bougie was now inserted into the uterus. Seven days after the first application of the galvanism the fœtus was expelled. Placenta expressed by the hand and uterus curetted. Puerperal period normal.

In applying this method, the author uses the constant current from a large Hirschmann's apparatus, and a cupping-glass such as is used on the breast. The cupping-glass being connected with the negative pole and placed on the breast, the large flat electrode is placed on the abdomen and connected with the positive pole.

Symphysiotomy in an Extremely Contracted Osteomalacic Pelvis.

Dimmock (*British Med. Journal*, 1893, No. 1695) reports a case in which symphysiotomy was done for osteomalacia. The patient, a Hindoo, had an irregularly contracted pelvis of extreme degree, the opening of the brim being a mere slit; the finger only being able to enter it. The external measurements were as follows: Highest points of crests, 8¾ inches; highest points of spines, 8 inches; between trochanters, 8½ inches; external conjugate, 6 inches. After section the pubic joint sprang apart to a distance of about 1¼ inches. The space at the pelvic brim being even yet too small, the fœtal head had to be perforated; this was done by trephining, and the head extracted with cranioclast. It was noticed that before the operation the horizontal rami of the pubes were in close approximation, so that the shape of the opening of the brim was in the form of a triangle; but when the joint was cut through they separated to a certain extent, and the conjugate diameter then measured about 2¼ inches. After delivery the bones were perforated by a drill; but the bone close to the symphysis was so softened by the disease that it was resolved to abandon the idea of fixing the bones by silver sutures, and finding that the cut surfaces of the joint could be approximated by moderate pressure, the wound was brought together by deep wire sutures passing close to the bone, with superficial sutures between them. Patient made a good recovery, the only complication being a slight rise in temperature, relieved by the passing of some ascaris lumbricoides. The bones united firmly.

A Case of Uterine Inversion.

Abeg (*Centralblatt für Gyn.*, 1893, No. 20) relates the case of a primipara, thirty-three years old, who came under his care suffering from inversion of

the uterus. Three weeks before she had been delivered by a careless nurse. At time of entrance patient was in an anæmic condition, with a temperature of 36.9° C., pulse 96–100, and a loud systolic basic heart-murmur. Internal examination showed the uterus inverted in the vagina, the mouths of the tubes showing plainly. There was no history of rheumatism. During the next four days attempts at replacement were made by means of the colpeurynter and strips of iodoform gauze, which efforts on the morning of the sixth day were successful, the uterus suddenly going back into its normal position. The heart murmur proved to be due to anæmia. The patient had during the three preceding weeks lost considerable blood in small amounts. The writer considers the colpeurynter an effective means of replacing an inverted uterus.

A Pregnant Uterus Bicornis.

Ratcliffe (*British Medical Journal*, 1893, No. 1695) exhibited specimens taken from a woman, aged thirty, who had been killed by an accident. On post-mortem the two pear-shaped horns of the uterus were found lying completely in the true pelvis. The rectum was mesial, and separating the two horns was a median recto-vesical fold two inches high. The right horn was four and one-eighth inches long, with a circumference of six inches, and its cavity showed a well-marked decidua, but no fœtus. The left horn was four and one-half inches long, with a circumference of six and one-half inches, and it contained a fœtus between the second and third months of gestation. The right ovary (that on the opposite side to the pregnant horn) showed a true corpus luteum, and there was none in the left ovary. The two uterine cavities were joined by narrow necks into a shallow cervical cavity about one-fourth of an inch deep, and freely patent into the vagina, which was partially double. On the upper and lower walls was a raphé not united. The woman menstruated regularly up to the time of her death.

Placenta Prævia associated with Unusual Size and Shape of Placenta.

Boxall (*Ibid.*) exhibited two specimens, in both of which the fœtus had been extruded, together with the placenta, in an unruptured sac, one at the eighth and the other at the sixth month of gestation. Both women were secundiparous. In the first specimen the placenta was larger than usual, and covered about one-third of the fœtal envelope, and, in addition, was elongated in a downward direction, so that, though as a whole the placenta maintained a normal position, the lower end of it projected in front of the fœtal head, and thus, by encroaching on the dangerous zone, gave rise to hemorrhage for five days before the expulsion of the mass. The whole of the chorion was missing, having separated from the margin of the placenta, and was probably passed with clots. In the second specimen the placenta was spread over the lower half of the fœtal envelope, and was so thin that, though it filled the lower segment, the head could be easily felt through it. The case was further complicated by a fibroid tumor of the anterior uterine wall. Some hemorrhage had taken place.

Ruptured Uterus and Vagina.

Routh (*Ibid.*) reported the case of a woman in which the house physician of the Charing Cross Hospital Maternity Department had performed version for an arm presentation, and delivered the child without much difficulty. The woman then became collapsed. There was some hemorrhage externally and symptoms of internal bleeding. It was found on examination that the vagina and the lower released uterine segment were badly torn; the umbilical cord passed through the rent. Intravenous injections of warm salt solution were tried, and the patient made more comfortable, but later she developed septic pleurisy and a parotid bubo, and died on the eighth day.

Distention of the Vagina and Uterus, with Muco-puriform Fluid, accompanied by Dilatation of the Bladder and Ureters.

Eccles reports, in the *Transactions of the Obstetrical Society of London*, the case of a second child of healthy parents in which, a few days after birth, a large tense swelling appeared in the vagina. About two months later the abdomen began to swell and become tympanitic. Vomiting was present. The child had retention of urine, but by means of a catheter a pint of clear urine was drawn. Rectal examination showed a tense mass lying in front of the anterior wall. The child eventually died, and post-mortem revealed a dilated vagina containing some ounces of muco-purulent fluid. The bladder was dilated and much hypertrophied. Uterus increased in size, but neither Fallopian tube was distended. The vagina was occluded at its lower end, its cavity measured four inches by three broad, and four inches from before backward. The cervix uteri would easily admit the little finger. Both ureters were dilated, and the kidneys hydronephrotic to a marked degree.

Fœtal Urine a Possible Source of the Liquor Amnii.

Helme (*British Medical Journal*, 1893), in an article on the intra-uterine secretion of urine by the fœtus, gives an analysis of urine passed by a child immediately after birth and before it had breathed. The urine was passed spontaneously.

Specimen 1 (half-ounce): No sugar; no albumin; no phosphates; no sulphates; chlorides present; urea present, 0.15 per cent., or 0.66 grains to the ounce; kreatinin present.

In another specimen, taken eight and one-half hours after birth, the examination was as follows: No sugar; no albumin; no phosphates; sulphates present; chlorides present; urea present, 0.3, or 1.32 grains to the ounce; kreatinin.

These analyses show that urea is present in considerable quantity in the urine of the normal living fœtus. It follows, therefore, that this urine is a possible source of the urea found in the liquor amnii, and that the fœtal renal secretion is a possible source of the liquor amnii itself. Kreatinin is known to be present in small amount in the amniotic fluid, but its presence in fœtal urine is especially interesting. Formulating his conclusions he sums up as follows:

The fœtal kidneys secrete actively during intra-uterine life.

The urine of the normal living fœtus contains urea and kreatinin.

The fœtal renal secretion is a possible source of origin of the liquor amnii; this is shown by the presence of the above substance in both fluids. The presence of sulphates and phosphates in the liquor amnii, and their absence in the fœtal urine, would point to there being an additional source of origin of the liquor amnii. The amount of urea and kreatinin excreted in the urine undergoes a marked increase during the first few hours after birth.

Poisoning by the Self-administration of "Diachylon" Lead Plaster for Procuring Abortion.

Pope (*British Medical Journal*, No. 1696, 1893) reports two fatal cases resulting from the taking of "diachylon" lead-plaster.

In the first case, a married woman, no history of lead-poisoning could be found, and although analysis after death produced no trace of the metal, incineration of a portion of one kidney showed its presence.

An examination of the body of the second case, which occurred some time after the first, showed the skin and conjunctivæ of a yellowish color; nothing abnormal could be found in the brain or other organs, except the intestines, which were contracted and contained a yellowish sticky fluid.

Both cases during life had had abdominal pain and tenderness, lost or weakened reflexes, although sensation was good; the characteristic blue line showed upon the gums of both.

In each case toward the close of life a spasm took place, the first dying in coma, the second from paralysis of the diaphragm.

In the first case considerable suspicion, and in the second direct evidence, showed that this preparation was taken with the idea of procuring abortion. Great care should be exercised by druggists in dispensing these preparations.

Four Cases of Extra-uterine Pregnancy.

Mackenrodt, at a meeting of the Gesellschaft für Geburtshülfe und Gynäkologie in Berlin (*Centralblatt für Gynäkologie*, 1893, No. 22), reported four cases of extra-uterine pregnancy, at the same time exhibiting specimens.

In the first case the tumor was found in the right tube, and a microscopical examination showed the presence of chorial villi. No trace of a fœtus could be found. The left tube was also enlarged and thickened, presenting symptoms of inflammatory change.

The second patient, aged thirty-one years, had symptoms of pain and hemorrhage, which had existed for some time. A tumor the size of a fist could be felt behind and to the left of the uterus, quite near it. The tube contained many villi, but no fœtus. Both the above cases recovered.

A right tubal pregnancy with pyosalpinx of the left tube was present in the third case. The fœtal sac had ruptured, causing considerable bleeding into the abdominal cavity. There was atresia of the tube, the ampulla containing an isolated collection of pus the size of a hazelnut.

The fourth case was interesting on account of the blood found in the abdominal cavity, which could not be accounted for, as the left tube, which

contained the pregnant sac, was not ruptured; there had been an old peritonitis. Considerable change and thickening had gone on in the right tube. Patient recovered.

He also reports a fifth case in which a patient, twenty-eight years of age, was being treated for cervical catarrh. Menstruation was absent. Considerable pain was felt in the right side, and examination showed an enlargement of the right tube, soft in character. Pressure on the breasts showed that colostrum in large quantities was present. Operation showed no pregnancy present, but the right tube was the thickness of two thumbs, and filled with pus. The fimbriated extremity was flattened and adherent to the cæcum. This patient recovered, but only after a considerable period.

A Case of Cæsarean Section.

Keith (*British Medical Journal*, 1893, No. 1696) gives his experience in operating upon a secundipara. The woman was small in size, and had an available conjugate of but three inches or under; the lateral space was diminished, and the descending rami of the pubes were fixed at a very acute angle. Both symphysiotomy and Cæsarean section were discussed, but owing to the peculiar shape of the pelvis, and particularly the pubic arch, the latter operation was decided on. It is futile, the author says, to give exact directions as to the position of the abdominal incision; it must be made entirely in regard to the situation and size of the uterus, bearing in mind that the section of that organ is to extend downward from close to the fundus. After delivery of the child the uterus contracted well, and after all the stitches had been introduced and tied, very little pressure was required to cause complete contraction. The Fallopian tubes were ligated, the ovaries not being interfered with. The writer discusses the various details of the operation, and concludes his article by saying that the question does not seem now so much to lie between the Porro and the Cæsarean operation, but between the latter and the division of the symphysis; the comparison, however, is limited, as with a conjugate of less than two and five-eighths or two and three-quarters inches, symphysiotomy is useless. In the hands of those accustomed to operations, Cæsarean section must be one of the most simple of all operative procedures.

Scarlet Fever in Pregnancy, with Infection of the Fœtus.

Ballantyne and Milligan (*Edinburgh Medical Journal*, July, 1893) record the case of a primipara, twenty years old, who was found on the physician's visit to be suffering from a typical scarlatinal sore-throat. At this time she was about seven months pregnant. Later the usual rash and temperature appeared, the former being decidedly marked on patient's chest and limbs. Two days later labor set in. The early stages of the parturition were normal, but the expulsion was somewhat delayed by weak uterine contractions. There was also some hemorrhage. The disease ran a typical course and in six days desquamation began.

The infant when born showed all the signs of immaturity; it was small in size and its nails were imperfectly formed. It was, however, born alive and cried, although feebly. As at birth it was covered by a thick layer of vernix

caseosa, the condition of the skin could not be seen, but later it was found that it also had, not, as was first supposed, the physiological redness of the newborn, but scarlatina. It moaned at intervals and was restless. The skin was red all over the body, but especially on the shoulders and thighs. Desquamation began at about the same period as in the mother. Both patients entirely recovered. After giving a general view of the literature of scarlet fever in pregnancy, the writer formulates the following conclusions:

1. When scarlatina occurs in pregnancy, the fœtus *in utero* is usually, but not invariably, affected.

2. It would seem as if the infection of mother and fœtus is practically simultaneous, for the infant at birth shows the fever in the same stage as that reached in the mother, and desquamation usually occurs at the same time in both.

3. The clinical features of scarlatina in the fœtus and newborn are the same as in later life; but the diagnosis is rendered difficult by the resemblance these symptoms bear to the normal conditions (erythema, desquamation, etc.) met with in the neonatal state.

4. The prognosis as regards both mother and fœtus is grave, but death does not invariably occur. The supervention of septicæmia is the greatest danger, and the chief treatment should be its prevention.

Puerperal Septic Intoxication (Sapræmia): its Symptoms and Treatment.

McCann (*Lancet*, 1893), in discussing the subject of septic intoxication in puerperal women, considers that in order to obtain a thorough conception of the nature of the malady it is necessary to draw analogies from general surgery and to look upon a puerperal woman as having undergone an operation—labor—of greater or less severity, and as possessing a a wounded surface in various stages of the healing process. Putrefaction becomes a predisposing cause of septic infection—first, by exciting inflammation and suppuration, thus providing a suitable medium, the inflammatory exudation or pus, in which pathogenic organisms may develop; and secondly, by lowering the vitality of the tissues, in consequence of which they are more readily invaded by the pathogenic fungi. The effects of putrefaction are local and general: the former consist of septic inflammation and suppuration dependent upon the irritation caused by the chemical products of putrefaction; the latter of a febrile affection.

The poison which is the product of the action of saprophytic organisms (they do not multiply in the blood) does not increase in the system, the effects being proportional to the dose. If the dose be small and the period during which absorption continues short, the resultant affection is known as "sapræmic fever." This form is most frequently met with among puerperal women.

Among the most common symptoms of septic intoxication are frontal headache, drowsiness, and a feeling of fatigue like that due to physical exertion, but also frequently accompanied by sleeplessness; general gastric disturbance, with jaundice. These symptoms are often present when the temperature is only slightly elevated; as the disease progresses there is a

further elevation up to 102° or 103°. Rigors, common in septicæmia, are rare in sapræmia. The fever is of a more continued character, marked daily variation being absent. Pulse-rate accelerated.

The lochia may or may not be foul; although the external discharge may not show signs of putrefaction, that which is pent up in the uterus may be foul in odor.

As regards treatment, it is necessary as far as possible to remove the septicity of the lochial discharge and to increase the elimination of the poison absorbed. For the first the author recommends the use of a continuous douche of half a pint of 1 : 2000 sublimate solution, or one pint of 1 : 4000 at a temperature of 115°, to be followed by the injection of boric acid or distilled water. During this process the patient's shoulders should be raised to secure good drainage. For the second the bowels should be kept open by means of sharp purgation, and diaphoresis secured by Dover's powders.

GYNECOLOGY.

UNDER THE CHARGE OF

HENRY C. COE, M.D., M.R.C.S.,
OF NEW YORK.

The Normal Endometrium.

Hofmeier (*Centralblatt für Gynäkologie*, 1893, No. 33) criticises Wyder's statement that the cilia of the corporeal epithelium have a motion from the os internum toward the tubes. Not only were his own studies conducted upon fresh uteri removed from mammals, in which the conditions ought to be the same as in the human female, but he also examined organs removed at the operating-table and at once immersed in warm saline solution. In several of the latter he demonstrated conclusively by removing strips of endometrium and placing them under the microscope, that minute particles of charcoal were invariably carried by the ciliary movement *from the fundus toward the os internum.*

Ligation of the Uterine Arteries in Cases of Fibromyoma.

Küstner reports two cases of uterine fibroid in which he ligated the uterine arteries per vaginam, having in one instance been obliged to abandon a total extirpation after opening the vaginal fornix. In both cases the tumor diminished in size within a few weeks, and the hemorrhages ceased. Whether the tumor continues to diminish to the same extent as after castration is as yet a matter of conjecture.

In another case the uterus was generally enlarged (though no fibroid could be detected), measuring five inches in depth, while the patient had profuse hemorrhages. Curettage was performed without benefit. The uterine arteries

were then ligated, when the bleeding ceased, and the uterine cavity measured only three inches at the end of six weeks. This seemed to show that the operation has a useful application in cases of uterine enlargement, with menorrhagia, other than fibroid degeneration. It would be indicated only in those which are obviously too obstinate to be cured by the ordinary means, such as curettage, amputation of the cervix, etc. As regards the technique, the writer differs somewhat from Gottschalk, preferring to incise the vaginal vault and to actually expose the arteries before passing the ligatures; the vaginal wound is closed after these are tied and cut off.

Ichthyol in Gynecology.

Schultz (*Orvosi Hetilap*; *Centralblatt für Gynäkologie*, 1893, No. 36), after observing thirty-five cases for two months, reports that he found a ten per cent. solution of ichthyol in glycerin, applied on tampons, especially valuable in the treatment of pelvic exudates and chronic oöphoritis and perioöphoritis. Nineteen patients were cured and twelve were relieved. In four cases of acute perimetritis the result was negative, from which he argues that the drug is contra-indicated in acute pelvic inflammation. Its analgesic action was most marked, being noted during the first week of treatment.

Polacco (*Int. klin. Rundschau*, 1892, 45–50), as the result of a series of 972 observations in Mangiagalli's clinic at Milan, extending over a period of fourteen months, arrives at the following conclusions: Ichthyol is the most powerful local analgesic yet known in gynecological therapeutics. It has an undoubted absorptive power in cases of pelvic exudation, its action being directly proportioned to the early stage at which it is used.

Intestinal Obstruction.

Stratz (*Zeitschrift für Geb. u. Gyn.*, Bd. xxv., Heft 2) analyzes ten cases —five in his own practice—in nine of which ileus was due to peritoneal adhesions, and in one to the presence of an ovarian cyst with a long pedicle. Cœliotomy was performed in every case, with two deaths. He believes that the infrequency of intestinal obstruction within the pelvic cavity, notwithstanding the common occurrence of perimetritis, is due to the presence of constant peristaltic movements. When intestinal adhesions occur, they develop so slowly that the gut has time to accommodate itself to abnormal conditions, especially to a certain amount of compression.

The diagnosis depends upon the presence of intense localized pain associated with intestinal disturbance. Suspicion would be awakened by the presence of a sensitive intra-pelvic tumor, with these symptoms. The ascites, which so commonly accompanies malignant disease, seems to prevent to a considerable extent the formation of adhesions. Abdominal section and the thorough separation of adhesions is the only treatment for ileus. It should not be delayed too long.

Reichel (abstract of monograph in *Centralblatt für Gynäkologie*, 1893, No. 37) thinks that sepsis is the true cause of ileus, the existing paralysis of the gut being due to the action of toxic germs upon the intestinal ganglia. The cause is clear in well-marked cases of peritonitis; but when there is

little or no elevation of temperature, and the patient dies of obstruction in from six to ten days, sepsis is often unsuspected, the true condition being revealed at the autopsy.

In his experiments upon dogs and rabbits the writer found that if a simple bend was made in the gut, by suturing the opposed peritoneal surfaces, the normal peristaltic movements were sufficient to overcome the obstruction. In man, however, the greater thinness and elasticity of the wall of the gut is not so favorable to the restoration of its normal calibre.

The majority of cases of acute obstruction follow abdominal section, and are due *not* to the formation of adhesions, but to sepsis.

In ileus from twist of the gut there are three factors which cause the obstruction—injury to the nerves of the intestine, disturbance of the circulation, and, as a result of the latter, bacterial infection of the peritoneum. In the majority of the cases of ileus the actual stenosis is slight.

The symptoms of obstruction begin to appear when the circulation in the affected loop is disturbed and peritonitis results. Practically, it is impossible to state in what cases the prognosis is most favorable after abdominal section. The writer believes that the great mortality is due to the fact that operative interference is so often delayed too long.

COMTE (*Revue méd. de la Suisse Rom.*, 1893, 3, 5) mentions as diagnostic points localized pain, tumor, and the fact that the portion of gut immediately above the point of obstruction is distended, and is the seat of peristaltic movements, as pointed out by Schlange. Wahl, on the contrary, thinks that peristaltic movements are only present when the ileus is due to pressure, as from a tumor; in true strangulation by adhesions there is no peristalsis in the proximal portion of the gut. Cœliotomy is the only treatment. If necessary, the intestines should be turned out of the wound, and all adhesions separated between ligatures to prevent hemorrhage. It is rarely necessary to resect the gut. If the point of obstruction cannot be found, an artificial anus should be established. If there is much tympanites, small longitudinal incisions should be made in order to evacuate the gas.

GONORRHŒAL SALPINGITIS.

DÖDERLEIN describes a specimen of pyosalpinx in which both tubes contained gonococci, though it was evident that the inflammation in the left was more recent than that in the right. Yet the former appeared macroscopically to be entirely healthy at the time of the operation, being patent and containing no pus, so that doubt was felt as to the propriety of removing it. The result of the examination leads the writer to believe that in cases of gonorrhœal infection both tubes are usually affected, so that the surgeon should remove *both*, even though one is apparently healthy.

TACHYCARDIA AFTER CŒLIOTOMY.

MANGIAGALLI (*Annal di Ost. e Gin.*, 1892, No. 10) reports two cases of ovariotomy in which the pulse ranged from 180 to 200 for several days after the operation, there being no elevation of temperature or evidences of sepsis. One patient died in collapse on the fifth day, while the other recovered. The author thinks that the phenomenon may have been due to the action of antiseptics upon the peritoneum and hence upon the sympathetic ganglia.

HYGIENE AND PUBLIC HEALTH.

UNDER THE CHARGE OF

EDWARD F. WILLOUGHBY, M.D.,
OF LONDON,

AND

CHARLES HARRINGTON, M.D.,
INSTRUCTOR IN MATERIA MEDICA AND HYGIENE, HARVARD MEDICAL SCHOOL.

Action of Common and Medicated Soaps and of Corrosive Sublimate on the Bacillus of Cholera.

In the *Hygienische Rundschau*, of August 15th, Dr. Gunning, Professor of Hygiene in the University of Amsterdam, gives an account of experiments conducted in his laboratory by Dr. Nijland, of the Dutch East Indian Army, on the action of common and medicated soaps and of corrosive sublimate on the bacillus of cholera diffused in ordinary river water, which appear to involve far wider issues than those which prompted them, viz.: the dangers apprehended from the use for ablution of the water of the river Vecht, in the event of a recurrence of the cholera epidemic at a time when the scarcity of the purer "Dune" ground-water should necessitate its employment for culinary and drinking purposes only. Dr. Nijland used Vecht water, to which were added agar-agar cultures of the bacillus or vibrio of cholera. The general conclusions were that while they soon died out of pure water, the greater the organic pollution present the longer did they retain their vitality and the larger the amount of germicides required for their speedy destruction, such reagents being almost useless in diarrhœal evacuations.

Ordinary soaps dissolved in Vecht water in the proportion of 1.8 per mill. did not destroy them within fifteen minutes, 2.4 parts per mill. being necessary to do so with certainty in ten minutes. So-called disinfecting soaps, containing 3 to 5 per cent. of carbolic acid, salicylic acid, creolin, etc., were no better, if so good. But 2.4 per mill. in a bath of 120 to 150 litres means the consumption of 290 to 360 grammes, whereas the soap commonly used does not exceed 9 to 24 grammes.

But when only 0.12 per mill. of a soap containing 1 per cent. of sublimate was dissolved in water charged with cholera bacilli (2000 to the cubic cm.) no more than 100 were alive after the lapse of one minute, and none at all in five; while 0.006 and even 0.003 of the pure sublimate was sufficient, and the addition of a little salt rendered it still more active.

Dr. Gunning recommends its employment in the form of "pastilles" or tabloids containing 5 mgrs. each, one or two to be used, according to the size of the bath; no possible danger could be incurred by such practice, since the maximum dose for internal administration is as high as 20 mgrs.

For the sterilizing of choleraic or typhoid stools, sublimate is, however, practically useless, from its coagulation of the albuminoid matters in which the bacilli become imbedded and in fact protected.

Diphtheria and Croup, and "Diphtheritic" Throats.

In the report of the medical officer of the Local Government Board, Dr. Klein describes the clinical phenomena and bacteriology of eight cases of ordinary typical diphtheria, "croups" of different forms, and of so-called "scarlatinal diphtheria," illustrating in the most remarkable manner the value of the determination of the presence or absence of Löffler's bacillus as a means of diagnosis. Bretonneau recognized the "false membrane" as essential, in fact as constituting the disease; Virchow divided all cases of pharyngitis and laryngitis into catarrhal, fibrinous, and diphtheritic, and later pathologists have defined his fibrinous exudations as superficial, and his diphtheritic as those infiltrating and inducing more or less necrosis of the mucous and submucous tissues. But all these are differences of degree, not of kind, and apart from the doubt attaching to mild cases of these as of any other diseases, there are at least three sets of problems with which the physician is frequently brought face to face, and which he cannot solve on clinical evidence alone. These are to distinguish—1, the true nature of foul sore-throats, certainly infectious, but with no definite exudation, few, if any, terminating fatally—such cases occurring either alone, or before, during, or after an epidemic of virulent and fatal diphtheria; 2, cases of "scarlatinal diphtheria," *i. e.*, of scarlatina in which all the visible phenomena of diphtheria supervene on those of scarlatina concurrently with or subsequently to the primary disease; and, 3, to differentiate between laryngeal diphtheria and "membranous croup," to say nothing of the catarrhal and spasmodic forms.

Of course, the neuroses or paralytic symptoms are absolutely characteristic of diphtheria, but they are often absent and always appear too late for actual diagnosis.

There can, however, be no longer any doubt that the bacillus of Löffler is the essential cause of diphtheria, that it never occurs in any other disease, and that it will always be found in the true diphtheria, however vague the clinical symptoms, if, and this is no small advantage, only it be looked for early enough. After the third day numerous foreign microbes make their appearance, and may even crowd out the specific one, but *before* that date the exudation may present an absolutely pure and abundant culture.

For the morphology of the bacillus recourse may be had to works on bacteriology, but it is also remarkable for its stability, no very appreciable modification of its form, or diminution of its luxuriance, and none whatever of its virulence being induced even by *acid* broth in cultures carried to the twentieth remove.

Dr. Klein's examination of the scarlatinal cases fully confirmed the conclusions of Babes, Escherich, Holzinger, Wurtz, and others, that, although simultaneous infection with diphtheria and scarlatina is possible, it may be laid down as a rule that diphtheritic symptoms appearing as a sequel to the fever—that is, after one, two, or three weeks—are true diphtheria, and will yield the bacillus in question; but that the like symptoms occurring as a complication, that is, in the course of the fever, are not, and though the streptococcus of scarlatina may be present, Löffler's bacillus will be looked for in vain.

Dr. Klein sums up his conclusions as follows:

1. Membranous croup of the larynx and trachea occurring concurrently with diphtheria of the fauces is *true* diphtheria.

2. The so-called scarlatinal diphtheria is not true diphtheria.

3. Diphtheria of the fauces and membranous croup, following sometimes after scarlatina, are both true diphtheria.

4. Membranous croup of the larynx and trachea, without diphtheria of the fauces, may be of two kinds: *a*, true diphtheria, or *b*, genuine fibrinous croup without the presence of the diphtheria bacillus, and therefore not true diphtheria.

Bretonneau himself had shown long ago, as have Reitz and others since, that a fibrinous *membranous* but not infectious exudation might be produced experimentally by a (chemical) irritant, and there is therefore no reason why it should not have a pathological though not a specific origin.

The Chemical Pathology of Diphtheria.

While Dr. Klein was determining the value of the Klebs-Löffler bacillus in enabling the physician to come to an early and positive diagnosis among doubtful "diphtheritic" and "croupous" cases, Dr. Sidney Martin has been engaged in a study of the chemical products of the bacillus in the human body and in culture fluids, and their physiological actions on rabbits. Beginning with the first, he extracted from the blood and spleen of persons who had died of the several forms of diphtheria, pharyngeal, laryngeal, and naso-pharyngeal, by means of alcohol alone, an albumose (deutero-albumose) and an organic acid. The latter is remarkable, since in anthrax, etc., the albumose is associated with an alkaloid. The albumoses (allied to digested peptones) cannot be distinguished from one another by chemical tests, but are easily distinguishable by their physiological actions.

Subcutaneously injected the diphtheritic albumoses gave rise to transient œdema with no tendency to necrosis, and a well-marked rise of temperature, a lesser degree of fever persisting for three or four days; the intensity, duration, etc., of these phenomena, and the termination in recovery or in death, depending, *inter alia*, on the strength and number of the injections.

More striking and characteristic than the pyrexia or the great retardation of the coagulation of the blood were the loss of weight and the muscular paresis identical with the paralytic symptoms so frequently met with in diphtheria.

Careful preparation of the nerves, and especially of the muscular and peripheral branches of those of the hind limbs, of the experimental animals (as well as of some from fatal cases in man) showed conclusively that these symptoms were due to progressive degeneration and atrophy of the axis cylinder, the sheaths being recognizable and intact. The loss of weight was remarkable, amounting in some cases to from one-quarter to one-half of that of the body, even after two injections only. It bore no proportion to the fever, and continued without interruption for a week, or in one case for ten days after the temperature had become perfectly normal, and what was still more surprising, it was not attended with any manifest wasting of the paralyzed muscles.

The organic acid had a similar action, but incomparably larger doses were required.

Roux and Yersin had from artificial cultures of the bacillus and subsequent sterilization of the fluid by passing it through a Pasteur-Chamberland filter, obtained a poison of such virulence that when inhaled and dried 0.0002 gramme was sufficient to kill a rabbit of three kilos in weight. From the fact that such minute doses exerted a prolonged action on the living organism, and that exposure to a temperature of 100° C. destroyed its properties, they rightly concluded that it was a ferment (diastose) which, locally produced by the bacilli, leavened the entire mass of the blood, or, as they express it in one of their papers:

"L'infection n'est produite par un microbe envahissant les tissus, mais par la diffusion dans l'organisme d'une substance toxique, préparée à la surface d'une muqueuse, pour ainsi dire, en dehors du corps."

They, however, in Dr. Martin's opinion, committed an error in using as a culture fluid veal-peptone broth, a medium unlike anything to be found in the living tissues; they thus obtained a product resembling the poison of diphtheria, but artificially intensified. Dr. Martin, on the other hand, used a beef broth containing 1 to 2 per cent. of alkali albumin, but no peptone; in this the bacilli after twenty to thirty days' incubation at 38° C. converted the alkali albumin into albumoses in which small quantities of the organic acid, already referred to, were found. In short, they effected the same changes as are found in the fluids of the body.

Dr. Martin therefore concludes:

1. That the bacillus forms in the diphtheria membrane and in culture fluids products, viz., albumoses and an organic acid identical with those found in the tissues of persons dead from diphtheria.

2. That the physiological actions of single or repeated doses of these products, viz., fever, emaciation, and progressive muscular paresis due to degeneration of the peripheral nerves, are the same as those of the corresponding substances obtained from the tissues, and as the phenomena of the disease itself.

3. That the bacillus is therefore the primary infective agent in diphtheria.

4. That it liberates in the membrane a ferment which when absorbed digests the proteids of the body, forming albumoses and an organic acid.

5. That these are the immediate agents in the production of fever, paralysis, emaciation, and death.

6. That the relatively enormous quantity of these products found in the spleen (in diphtheria as in anthrax) is explicable by the larger proportion of proteids normally present—stagnating, so to say—in the blood of the spleen than in the general circulation.

[P. S. Does not this suggest a search for like secondary pathological poisons in the enlarged spleens of malarial, enteric, and other fevers, including influenza?—E. F. W.]

Disinfection of Letters.

Mr. Washington Lyon (in a letter to the *British Trade Journal*, quoted by *Sanitary Record*, March 1, 1893) gives an interesting proof that steam is

admissible for disinfecting letters. All letters written from the Asylums Board Hospital in Kent are passed through the steam disinfector before being mailed. In 1884 there were a thousand smallpox patients at the hospital camps, and the post-office authorities complained that so many of their employés were taken ill with smallpox. Since this method of disinfection was adopted no complaint has been made. Neither the ink, the gum of the envelope, nor the stamp is affected by this process.

Antagonism between the Bacillus Pyocyaneus and the Bacillus of Tuberculosis.

Dr. Klein, some months before the forced and ill-advised announcement by Prof. Koch of the influence ascribed to certain products of the bacillus of tubercle in inhibiting the progress of tubercular disease, had already tried the effect of frequent injections of the sterilized fluid containing the chemical products of the artificial culture of the bacilli on the course of the disease, induced in animals by inoculation, but with completely negative results.

He then turned his attention to the products of the growth of the bacillus pyocyaneus. Evidence of tuberculosis having appeared in twenty-six guinea-pigs a month after inoculation with cultures from a human tubercular lung, he, on twenty-three successive occasions within about five weeks, injected (*a*) eight with sterilized culture fluid of tubercle bacilli, (*b*) eight with one of bacillus pyocyaneus, and (*c*) eight with a mixture of these, (*d*) the remaining two being retained as control animals. During the following month all died of tuberculosis except five of those that had been inoculated with the bacillus pyocyaneus. They, however, lost flesh and gradually succumbed in the course of the next six weeks. Though far from satisfactory, the results were so far encouraging, they showing that even in the very dilute form which he had employed the pyocyaneal products they had prolonged life, and greatly retarded the progress of the disease. He accordingly next injected eight guinea-pigs with tubercle as before; and on the manifestation of the disease in all, he injected six of them on thirteen consecutive occasions with undiluted broth cultures (sterilized) of bacillus pyocyaneus. The control animals had died of acute tuberculosis before these remedial injections of the others were nearly concluded, in fact within a month of inoculation; and one of those treated died soon after, with, however, far less post-mortem evidence of disease, but the remaining five were all alive and in very fair health and condition two months later, when they were killed for examination. The inguinal glands were found to be enlarged from old inflammatory thickening, but except a few gray points on the livers, and a minute nodule in the lung of one, there were no signs of the tuberculosis which all had manifested after inoculation. The same unequivocal arrest of the disease was observed in another series of four treated in like manner, although unfortunately they, with a number of others, were carried off by an epidemic of pneumonia.

The injections employed with such a degree of success were "three Pravas divisions" of a sterilized broth culture of bacillus pyocyaneus, incubated for ten days at a temperature of 37° C., or that of the human body.

PATHOLOGY AND BACTERIOLOGY.

UNDER THE CHARGE OF

JOHN SLADE ELY, M.D.,

PROFESSOR OF PATHOLOGY IN THE WOMAN'S MEDICAL COLLEGE OF THE NEW YORK INFIRMARY; ASSISTANT IN PATHOLOGY IN THE COLLEGE OF PHYSICIANS AND SURGEONS; PATHOLOGIST TO BELLEVUE HOSPITAL; AND ASSISTANT PHYSICIAN TO THE ROOSEVELT HOSPITAL OUT-PATIENT DEPARTMENT.

Bacteriological Diagnosis of Cholera.

During the cholera epidemic of 1892 the large number of diarrhœal diseases of various kinds simulating the graver malady, and from which they could be distinguished with certainty only by means of bacteriological examination, emphasized the importance of so simplifying the process of such examinations as to make their result attainable as quickly as should be consistent with accuracy. In view of the impending danger of another epidemic in Europe, Koch (*Zeitschrift für Hygiene und Infectionskrankheiten*, 1893, xiv. Heft 2) presents the methods of examination for the cholera bacillus employed and found reliable at the Hygienic Institute of Berlin.

In the first place it is stated that in about one-half the cases of true cholera the diagnosis may be made from a microscopic examination of the rice-water discharges, occupying a few moments only. A small amount of stringy mucus is selected from a fresh stool, is fixed upon one or more cover-glasses by the ordinary method of drying and heating, and is stained with a diluted Ziehl's solution (carbolic fuchsin). In such a preparation the cholera bacilli may usually be seen either in "pure culture" or associated with the bacillus coli communis alone, from which its peculiar shape readily serves to distinguish it. The cholera bacilli are clustered in groups, the bacteria in each group lying more or less parallel to one another, or, as Koch expresses it, like fish swimming in a slowly flowing stream.

This simple procedure may in many cases be sufficient to confirm the diagnosis in suspicious cases. But, in the majority, for final proof, cultures will be made. The time necessary for these may be materially shortened by the use of Dunham's peptone solution (a sterilized alkaline solution of one per cent. peptone in one-half per cent. salt solution). Shreds of mucus from suspected stools are suspended in this solution at the temperature of the body for about six hours, at the expiration of which time, if cholera bacilli are present in any considerable numbers, the surface of the mucus becomes cloudy, owing to the rapid development of the bacilli. Such shreds may then be examined microscopically as described above, or may be used for the inoculation of gelatin or agar plates, in which the germs develop much more rapidly after the use of the peptone solution.

Koch considers the growth of the cholera bacilli on gelatin so characteristic as to make the gelatin plate an important diagnostic aid, though on account of the lower melting-point of gelatin the growth may be more rapidly forced on agar, which may be kept at the body temperature. Thus on agar, colonies sufficiently developed for diagnostic purposes frequently appear in from

eight to ten hours when the inoculation has been from material previously immersed in the peptone solution. The agar plate then, combined with the peptone solution, affords the speediest reliable method of diagnosis.

High diagnostic value is also attributed by Koch to the "cholera red" reaction when carefully carried out. The peptone culture affords the best material for it. The culture should be pure, should contain nitrates in abundance, and the sulphuric acid employed should be chemically pure.

At the conclusion of his paper Koch describes a new method for the detection of cholera bacilli in water. Large quantities of the water to be examined are treated with peptone and salt in such quantity as may be necessary to establish the proportions of the peptone solution, and are then kept in ovens at the temperature of the body for from ten to twenty hours, after which agar plates are prepared. Suspected colonies are examined microscopically and are further cultivated. By this means Koch has repeatedly been able to detect cholera bacilli in water after other methods had failed.

Immunity: Hydrophobia, Glanders.

It will perhaps have excited surprise that in our discussion of immunity Pasteur's work upon hydrophobia has had no mention. This is because the immunity obtained by Pasteur is brought about by the use of an attenuated virus, and appears, therefore, to depend for its production upon a principle quite distinct from that under discussion—the antitoxin theory of immunity. It is not to be inferred from this, however, that the attenuated virus theory and the antitoxin theory are necessarily irreconcilable, for the experiments about to be related, as well as those of Behring and Kitasato, and Brieger and Fraenkel upon diphtheria and tetanus, and those of the brothers Klemperer on pneumonia, all show a close relationship between the immunity produced by both methods, in that the blood-serum (presumably containing an antitoxin) of animals immunized by repeated injections of attenuated virus has been shown to confer immunity. But granting this suggested relationship, the experiments of Pasteur bear in no way directly upon the antitoxin theory. Some interesting observations upon hydrophobia, published by Tizzoni and his pupils, and by Babes and Cerchez, add weight to this theory, however, and must be briefly summarized.

In August, 1891, Tizzoni and Schwarz (*La Riforma Med.*, 1891, No. 196) made a preliminary report of experiments which were augmented and published at length in January of the following year (*ibid.*, 1892, Nos. 18, 19, 23, 25). In these experiments rabbits were made immune to rabies by treatment with attenuated virus obtained from the medulla oblongata of rabbits which had succumbed to the virulent poison, or *virus fixe* as it is called. The blood serum of animals thus immunized was found to be capable of conferring immunity to other rabbits when injected into the jugular vein in doses of about 5 c.cm., but the blood of the animal so immunized was incapable of further communicating immunity to a third generation. Experiments with immune dogs showed the protective power of their blood-serum to be inferior to that of rabbits.

By treatment with alcohol, Tizzoni and Schwarz precipitated a substance from the serum of their immune rabbits, believed by them to be of the nature

of a globulin and similar in its action to that of the tetanus antitoxin in protecting from tetanus, though evidently distinct from the latter in that it had no antagonistic action to the poison of tetanus.

In October, 1891, only about two months after the appearance of the first paper by Tizzoni and Schwarz, BABES and CERCHEZ (*Annales de l'Institut Pasteur*, 1891, No. 10) described some interesting experiments on the action of the body juices of animals immune to rabies upon the *virus fixe* of the disease. Among other things they found that the blood-serum of immune dogs protected other dogs from inoculations of the virulent virus and cured two of four in which the treatment was begun *after* the inoculation of virulent virus into the brain. The importance of these experiments of Babes and Cerchez is enhanced by the fact that they were carried on quite independently of the Italian observers, and have even led to a dispute as to priority.

Encouraged by their success, Babes and Cerchez undertook the treatment of human subjects. Twenty-six persons had been badly bitten by a rabid wolf. The twelve of these most severely injured were given, in addition to the Pasteur treatment, four to six injections of 10 c.cm. each of blood-serum from two immune boys (laboratory helpers who had been immunized) or from immune dogs. That only one of those so treated died is strongly suggestive of the efficacy of the treatment, as the Pasteur method alone has given its most disappointing results in similar cases of wolf bites.

During the following year, 1892, it was discovered by Centanni (*La Riforma Med.*, 1892, Nos. 102 and 103) that repeated inoculations with attenuated virus were not necessary to the production of immunity to rabies in rabbits, but that by treating an emulsion of the medulla oblongata of rabbits which had died of rabies with artificial gastric juice a vaccine might be obtained which, while harmless in itself, had still a powerful immunizing action.

Working further with this method, TIZZONI and CENTANNI (*La Riforma Med.*, 1892, No. 109; also *Deutsche med. Woch.*, 1892, Nos. 27 and 31) demonstrated that the blood of animals made immune by this method was capable of conferring immunity in turn to others, and, furthermore, possessed marked curative qualities when injected into animals suffering from well-developed rabies. Experiments were made upon five rabbits suffering from rabies induced by injections of a virus which killed control animals in from fifteen to seventeen days. Intra-venous, intra-peritoneal, and subcutaneous injections of from 3 to 5 c.cm. each were given, beginning twice on the seventh day, once on the tenth, once on the eleventh, and once on the fourteenth after the inoculation, and when in all symptoms of the disease had already become more or less pronounced. All five of the animals recovered, and had remained healthy at the time of writing.

Efforts to separate the immunizing substance from the blood-serum resulted in the verification of the previous experiments of Tizzoni and Schwarz. Alcohol precipitated a substance which, when dissolved in water, was found to contain the immunizing principle, neutralizing the virulence of the *virus fixe* when mixed with it in the test-tube, and retaining the power of both conferring immunity and curing animals in the early stages of rabies. The substance thus separated is believed to be the specific antitoxin of hydrophobia, and Tizzoni and Centanni announce themselves as desirous to test the curative value of their remedy in a human case of the disease.

[Those desiring to acquaint themselves more fully with the work of Tizzoni upon this subject are referred to a paper by him, read before the British Medical Association in 1892, and published in the *British Medical Journal* of March 11, 1893, page 516.]

In connection with these experiments upon immunity to hydrophobia we may briefly notice some interesting attempts to protect horses from glanders, by injections of blood-serum of animals which had recovered from the disease, which have recently been reported by HELL (*Zeitschrift für Veterinärkunde*, 1892, Heft 12; cf. *Deutsche med. Woch.*, 1893, No. 7, 163). With a view to protecting the young horses of a hussar regiment from glanders, which had shortly before proved very destructive, Hell tried the experiment of injecting the blood-serum of horses which had recovered during former epidemics into the veins of those which he desired to protect. Fifty-four horses were thus treated, three of which were sick with the disease when the treatment was begun, the usual dose being about 40 c.cm., repeated until each animal had received about 300 c.cm. in the course of three weeks. None of the animals so treated was attacked with the disease, though kept in stalls where others had been sick before, and notwithstanding that an epidemic of the disease prevailed at the time in the regiment. Recovery was perfect in the case of the three animals affected with the disease before treatment.

Stimulated by these successes, TOEPPER (*Berliner thierärzlicher Wochenschrift*, 1893, No. 2) treated sixty horses on two farms where glanders was beginning to break out, with the result of stopping further progress of the disease and curing the animals already affected.

It would thus appear that the blood-serum of animals which have survived glanders possesses the power to protect animals exposed to the contagium of the disease and to cure those beginning to be afflicted with it. In a subsequent notice it will appear that similarly the blood of convalescents from typhoid fever is capable of preventing the lesions in animals usually resulting from inoculations of the typhoid bacillus.

TUBERCULOSIS OF BRONCHIAL LYMPH NODES IN ITS RELATION TO TUBERCULOSIS IN YOUNG CHILDREN.

To everyone acquainted with the terrible mortality of tuberculosis among young children, every effort to throw light upon the etiology of the disease, and thereby to increase our ability to curtail its ravages, must be most welcome. It has long been widely known that the bronchial lymph nodes are a very frequent seat of "scrofulous degeneration," as it was called by the older physicians, or of tuberculosis, as we now know it to be; and even before reports of cases began to appear in which the origin of a general miliary tuberculosis had been found in the rupture of such cheesy glands into one or more of the adjacent vessels, a close etiological relationship was believed to exist between these cheesy lymph nodes and the more widely distributed manifestation of the disease. Thoroughly convinced of the correctness of this view, H. NEUMANN (*Deutsche med. Wochenschrift*, 1893, Nos. 9–17) reviews the evidence in a carefully written article, discussing more particularly the manner in which the bronchial lymph nodes become affected.

This he believes to be possible in one of two ways only: either by direct hereditary transmission or by contagion. As the result of study of the

statistics of asylums and nurseries, he is led to consider the former of these methods to be very unusual, while, on the other hand, the theory of infection by inhalation affords a plausible explanation of many observed facts inexplicable by the other theory. For example, it is well known that inorganic particles of dust, and bacteria other than the tubercle bacillus, are frequently taken up by the bronchial mucous membrane, and are conducted by the bronchial lymphatics to the nearest lymph nodes, where they are deposited, and there is every reason to suppose that the same path is traversed by the tubercle bacillus when it finds entrance to the bronchial mucous membrane. The entrance of the tubercle bacilli is believed to be facilitated by any abnormality of the bronchial mucous membrane, and, once in the lymph channels, their onward progress would be more rapid in the congested lymphatics of inflammatory conditions. In this way Neumann explains the frequent sequence of tuberculosis upon measles and other diseases in which the bronchial mucous membrane in inflamed. Furthermore, the occurrence of acute inflammation of the lungs or bronchi is believed to materially contribute to the rupture of pre-existent cheesy glands, and to the consequent dissemination of the tubercular virus throughout the body.

The diagnosis of tuberculosis of the bronchial lymph nodes is attended with much difficulty, though in many cases quite possible. When it can be made with a fair degree of certainty, much light may often be thrown upon the nature of otherwise obscure infantile maladies. The diagnosis may be made when many bronchial glands are enlarged together, so that a bunch of considerable size results, giving rise to symptoms of compression upon the bronchi or on the adjacent nerves. Percussion may aid in the detection of large tubercular nodes in the anterior mediastinum, but is believed to be thoroughly unreliable when over the back. On the other hand, the occurrence of harsh, dry bronchial breathing over the root of the lungs behind, with the patient's mouth closed, is believed to be of much diagnostic significance. Neumann also describes a peculiar cough as characteristic of enlarged bronchial lymph nodes, resembling in its paroxysmal quality the cough of pertussis, but being of longer duration, and not communicable by contagion.

[In connection with this article, we would call the attention of those interested in the relation of cheesy bronchial glands to general tuberculosis in children, to a suggestive paper upon this subject by W. P. Northrup, in the *New York Medical Journal* of February 21, 1891.]

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All communications should be addressed to

DR. EDWARD P. DAVIS, 250 South 21st Street, Philadelphia, U. S. A.

Or

DR. HECTOR MACKENZIE, 59 Welbeck St., Cavendish Sq., W., London, Eng.

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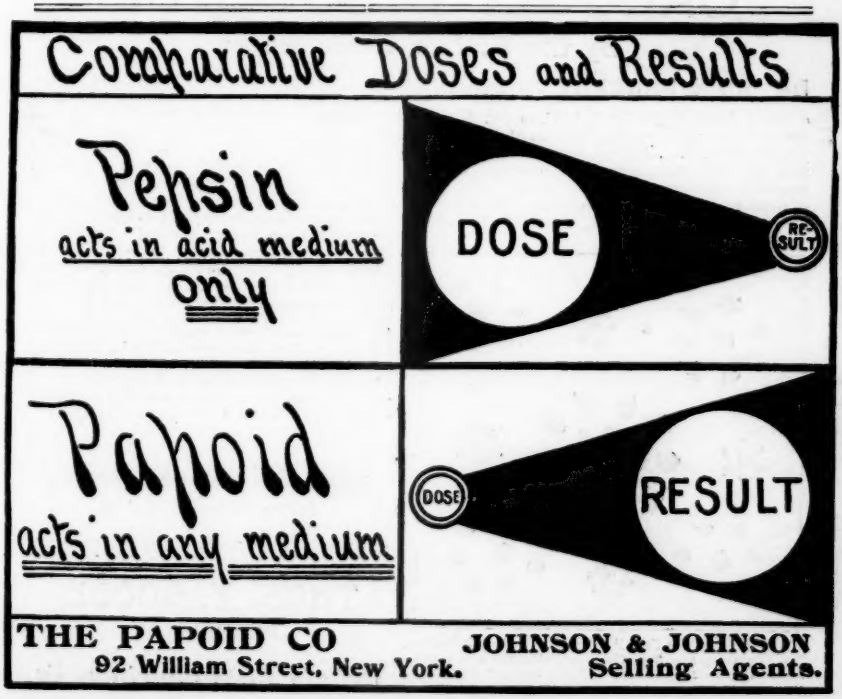

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DR. JOHN HERBERT CLAIBORNE, of Petersburg, Va., *ex-President and Honorary Fellow Medical Society of Virginia, in a letter, dated September 3, 1892, to Dr. E. C. Laird, Resident Physician at the Buffalo Lithia Springs,* says:—"I send by this mail a box of Calculi, passed at various times within the last year by Hon. T. J. Jarratt, our former Mayor, whilst drinking the Buffalo Lithia Water. They give but little pain now when passing. I have never critically examined the broken Calculi, passed in such quantities from Mr. Jarratt's bladder, but am under the impression that the most of them are magnesian phosphates. There were specimens, however, which presented the appearance of oxalates, and some, I remember, impressed me specially as being uric acid. I do not pretend to account for the mode of their solution by the Buffalo Lithia Water. There is nothing in its analysis which would warrant such results: but the results are there, and seeing is believing. I can only suppose that in **Nature's alembic there has been some subtle solvent evolved, too subtle to be caught by our coarse re-agents, which make this wonderful disintegration.** 'There are many things in heaven and earth not dreamt of in our philosophy,' and his is a short creed who only believes what he can prove or explain."

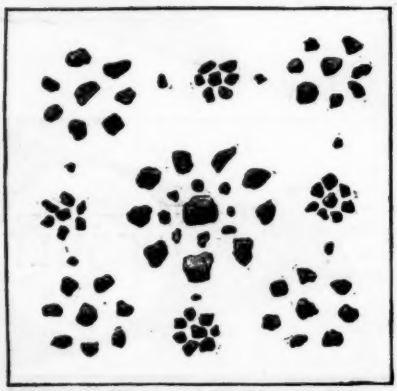

Illustration of the Calculi referred to by Dr. Claiborne. The engraving was made from a photograph and represents the exact shape of the Calculi; they are four times size of above.

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The success of Fellows' Syrup of Hypophosphites has tempted certain persons to offer imitations of it for sale. Mr. Fellows, who has examined samples of several of these, ***finds that no two of them are identical,*** and that all of them differ from the original in composition, in freedom from acid reaction, in susceptibility to the effects of oxygen when exposed to light or heat, ***in the property of retaining the strychnine in solution,*** and in the medicinal effects.

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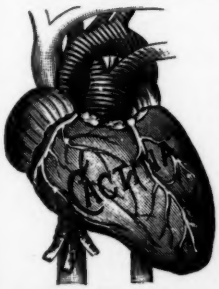

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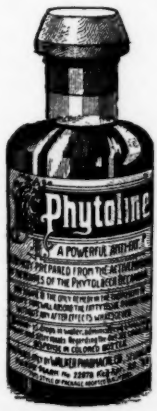

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the California Fig Syrup Company manufactured, from the juice of True Alexandria Senna and an excellent combination of carminative aromatics with pure white sugar, the laxative which is now so well and favorably known under the trade name of "Syrup of Figs." With the exceptional facilities, resulting from long experience and entire devotion to the one purpose of making our product unequalled, this demand for the perfect laxative

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a few figs are used, but to distinguish it from all other laxatives, and the United States Courts have decided that we have the exclusive right to apply this name to a laxative medicine. The dose of

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A too Common Affront to the Profession.

About a year since the *Journal of the American Medical Association*, in an editorial article, referred in unqualified language to the strained relations which it asserted were existing between physician and druggist; the salient cause being the habit of counter prescribing, coupled with the more vicious habit of substituting. Since then, if we may judge from the tone of the bulk of new literature being sent out, the substitution habit is shown to be the one great enemy overtopping all others, to successful medical practice.

We do not mean to assert that all pharmacists are given to the habit. On the contrary we believe a large majority of them to be entirely free from and above suspicion. Still the fact remains that substitution is practiced to such an extent as to engender anxiety and timidity on the part of prescribing physicians.

Persistent effort at substitution is but a commendation of the genuine product sought to be imitated, and the practicing physician is quick to recognize the fact. And, once recognizing it, his confidence in the genuine is strengthened, while at the same time he is forced into the unpleasant attitude of maintaining a constant wariness over his prescriptions.

As fairly typifying this condition we give below an extract from a letter from Dr. Bostock, of Galena, written Oct. 24th, 1893, to the Antikamnia Chemical Co. This letter is, by the way, a fair prototype. He says:

"I became dissatisfied some time since with the action, or rather non-action, of what I supposed to be Antikamnia. I began to look into the matter and discovered the druggist had been substituting in my prescriptions. I then had him get me tablets which I felt quite sure he, with any appliances he had, could not imitate; since which time I have been entirely satisfied with its action. I am satisfied that much *stuff* is sold and palmed off as Antikamnia, much to the detriment of your article, which has proven so very satisfactory to me. In many cases where quinine is indicated, I cannot prescribe it on account of its action on the brain, unless with Antikamnia, which seems to remove the objectionable feature."

The foregoing will surely justify all practitioners, where they may have cause to suspect they are being subjected to any such practices, in insisting upon the perfect integrity of *everything* they specify in their prescriptions. *The doctor has the highest and best right to insist that no worthless substitute be imposed upon his defenseless patient. He knows the specific effect of the genuine drug and knows equally well it cannot be successfully imitated.*—**Courier of Medicine, Nov., 1893.**

Flint on Auscultation and Percussion.—Fifth Edition.

A Manual of Auscultation and Percussion; Of the Physical Diagnosis of Diseases of the Lungs and Heart, and of Thoracic Aneurism. By AUSTIN FLINT, M. D., LL. D., Professor of the Principles and Practice of Medicine in Bellevue Hospital Medical College, N. Y. New (fifth) edition. Edited by JAMES C. WILSON, M. D., Lecturer on Physical Diagnosis in the Jefferson Medical College, Philadelphia. In one handsome royal 12mo. volume of 274 pages, with 12 illustrations. Cloth, $1.75.

Ten years ago Prof. Flint issued his work on physical diagnosis. With unsurpassed advantages for clinical study, of an original, investigating mind, and gifted with an unusually strong, facile pen, Dr. Flint was just the man to produce a good work. He did. It immediately took first rank and has since retained it. No similar work has been more studied or more relied on. The book contains the results of Dr. Flint's original investigations, but its chief value lies in the clearness and appropriateness of style, the accuracy of its statements, its scientific method, and the practical treatment of subjects at once difficult and essential to the student of medicine. The work is a classic, and the present edition, with the additions that progress has made necessary, will be warmly received.—*Medical Record*, February 28, 1891.

Holmes' Principles and Practice of Surgery.—Fifth Edition.

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To the younger members of the profession and to others not acquainted with the book and its merits, we take pleasure in recommending it as a surgery complete, thorough, well-written, fully illustrated, modern, a work sufficiently voluminous for the surgeon specialist, adequately concise for the general practitioner, teaching those things that are necessary to be known for the successful prosecution of the physician's career, imparting nothing that in our present knowledge is considered unsafe, unscientific or inexpedient.—*Pacific Medical Journal*, July, 1889.

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So comprehensive a treatise could not be brought within the limits of a book of this size, were not two things especially true. First, Dr. King is a teacher of many years' experience, and knows just how to present his subjects in a manner for them to be best received; and, secondly, he can put his ideas in a clear and concise form. In other words, he knows how to use the English language. He gives us the plain truth, free from unnecessary ornamentation. Therefore we say there are nine hundred pages of matter between the covers of this manual of four hundred and fifty pages. We cannot imagine a better manual for the hard-worked student; while its clean and practical teachings make it invaluable to the busy practitioner. The illustrations add much to the subject matter.—*The National Medical Review*, Oct. 1892.

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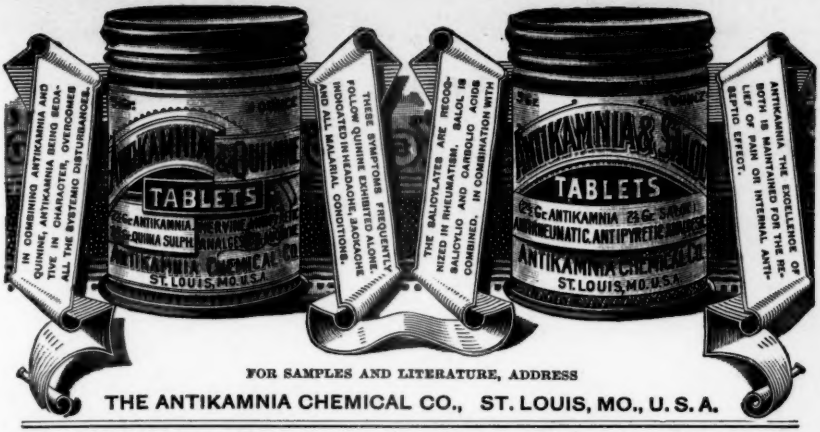

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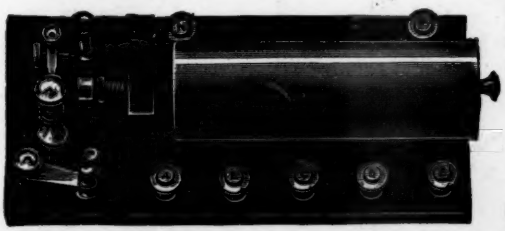

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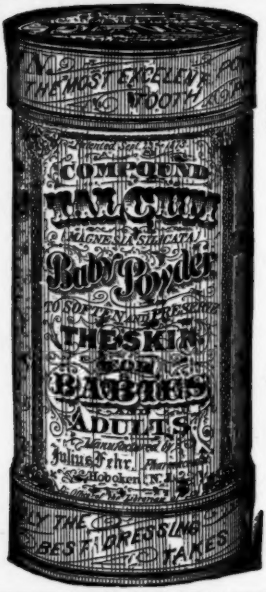

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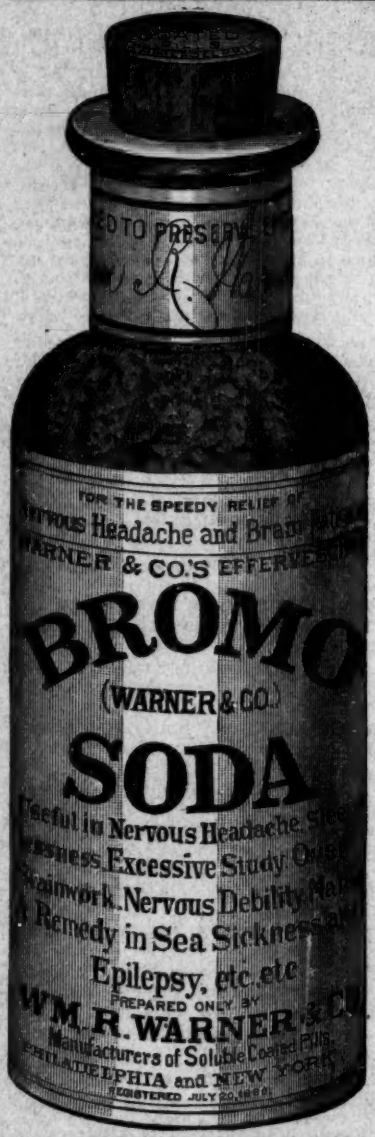

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